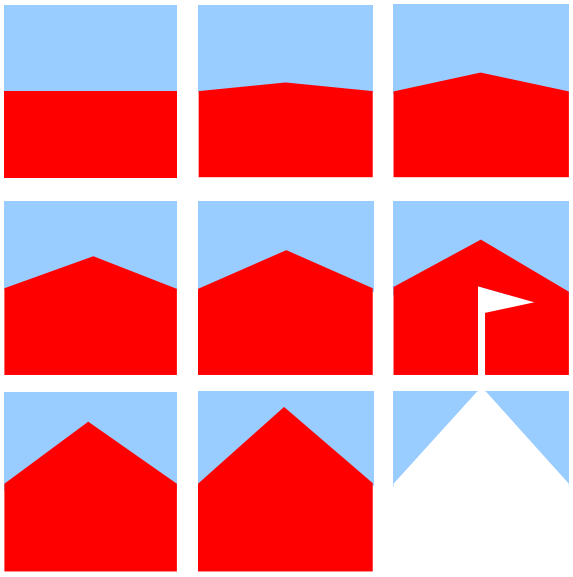
ARMSTRONG ELEMENTARY SCHOOL ROOF REPLACEMENT and MASONRY RESTORATION



Hampton City Schools

PROJECT MANUAL

HUDSON + ASSOCIATES ARCHITECTS

April 23, 2013

ARMSTRONG ELEMENTARY SCHOOL ROOF REPLACEMENT AND MASONRY RESTORATION

SECTION 00005

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SECTION 010950 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. Drawings and general provisions of Contract, including General Conditions and other Division 0 and Division 1 specification sections, apply to this section.

1.2 DEFINITIONS

A. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other Contract Documents, including drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in Contract Documents are defined generally in this article. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the Work to the extent not stated more explicitly in another provision of Contract Documents.

B. General Requirements: Drawings and general provisions and the requirements of Division 0 and Division 1 sections apply to the entire work of the Contract.

C. Indicated: The term "Indicated" is a cross-reference to details, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for the purpose of helping the reader locate cross-reference, and no limitation of location is intended except as specifically noted.

D. Directed, Requested, etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Architect/Engineer," "requested by Architect/Engineer," etc. However, no such implied means will be interpreted to extend Architect's/Engineer's responsibility into Contractor's area of construction supervision.

E. Approve: Where used in conjunction with Architect's/Engineer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of Architect's/Engineer's responsibilities and duties as specified in General Conditions. In no case will "approval" by Architect/Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of the Contract Documents.

F. Project Site: The space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other Work as part of the project. The extent of project site is shown on drawings as construction limits, and may or may not be identical with description of land upon which project is to be built.

G. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.

H. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unpacking, assembly, installation, etc., as applicable in each instance. "Furnish" shall mean to be furnished by the Contractor unless specifically stated to be furnished by the Owner.

I. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance. Unless specifically stated otherwise, material and equipment to be installed by the Contractor shall be furnished by the Contractor.

J. Installer: The entity, person or firm engaged by the Contractor or its Subcontractor or Subcontractor for performance of a particular unit of Work at project site, including installation, erection, application and similar required operations. Installers shall be expert in the operations they are engaged to perform.

K. Testing Laboratory: An independent entity engaged to perform specific inspections or tests of the Work, either at project site or elsewhere; and to report and when required to interpret results of those inspections or tests.

L. Including: Except as otherwise defined in greater detail, term "including" means "including but not limited to."

1.3 FORMAT AND SPECIFICATION EXPLANATIONS

A. Specification Production: None of these explanations will be interpreted to modify substance of requirements. Portions of these specifications have been produced by Architect's/Engineer's standard methods of editing master specifications, and may contain minor deviations from traditional writing formats. Such deviations are a normal result of this production technique, and no other meaning will be implied or permitted.

B. Format Explanation: The format of principal portions of these specifications can be described as follows; although other portions may not fully comply and no particular significance will be attached to such compliance or non-compliance.

C. Sections and Divisions: For convenience, basic unit of specification text is a "section," each unit of which is named and numbered. These are organized into related families of sections, and various families of sections are organized into "divisions," which are recognized as the present industry-consensus on uniform organization and sequencing of specifications. The section title is not intended to limit meaning or content of section, nor to be fully descriptive of requirements specified therein, nor to be an integral part of text.

1. Each section of specifications has been subdivided into three (3) or less "parts" for uniformity and convenience. Part 1 - General, Part 2 - Products, and Part 3 - Execution. These do not limit the meaning of and are not an integral part of text which specifies requirements.

D. Underscoring: Used strictly to assist reader of specification text in scanning text for key words in content. No emphasis on or relative importance of text is intended where underscoring is used.

E. Imperative Language: Used generally in specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by Contractor. For clarity of reading at certain locations, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by Contractor, or when so noted, by others.

F. Section Numbering: Used to facilitate cross-references in the Contract Documents. Sections are placed in Project Manual in numeric sequence; however, numbering sequence is not complete, and listing of sections at beginning of Project Manual must be consulted to determine numbers and name of specification sections in the Contract Documents.

G. Page Numbering: Numbered independently for each section; recorded in the Table of Contents in the Project Manual. Section number is shown with page number at bottom of each page, to facilitate location of text in Project Manual.

H. Project Identification: Project name and number are recorded at top of each page of specifications to minimize possible misuse of specifications, or confusion with other project specifications.

I. Specification Content: Because of methods by which this project specification has been produced, certain general characteristics of content, and conventions in use of language are explained as follows:

J. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended as minimum for the Work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum with reasonable limits. In complying with requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to Architect/Engineer for decision before proceeding.

K. Specialists; Assignments: In certain instances, specification text requires (or at least implies) that specific work be assigned to specialists or expert entities, who must be engaged for performance of those units of work. These must be recognized as special requirements over which Contractor has no choice or option. These assignments must not be confused with (and are not intended to interfere with) normal application of regulations, union jurisdictions and similar conventions. One purpose of such assignments is to establish which party or entity involved in a specific unit of work is recognized as "expert" for indicated construction processes or operations. Nevertheless, final responsibility for fulfillment of entire set of requirements remains with Contractor.

L. Trades: Except as otherwise indicated, the use of titles such as "carpentry" in specification text, implies neither that the Work must be performed by an accredited or unionized tradesperson of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by tradesperson of that corresponding generic name.

M. Abbreviations: The language of specifications and other Contract Documents is of the abbreviated type in certain instances, and implies works and meanings which will be appropriately interpreted. Actual work abbreviations of a self-explanatory nature have been included in texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and in schedules. These are frequently defined in section at first instance of use. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the Contract Documents so indicates.

1.4 DRAWING SYMBOLS

General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Refer instances of uncertainty to Architect/Engineer for clarification before proceeding.

1.5 INDUSTRY STANDARDS

A. General Applicability of Standards: Applicable standards of construction industry have same force and effect (and are made a part of Contract Documents by reference) as if copied directly into the Contract

Documents, or as if published copies were bound herewith. No provisions of any referenced standard specification, manual, code, or instrumentation shall be effective to change the duties and responsibilities of the Owner, Contractor, or Architect/Engineer or employees from those set forth in the Contract Documents, nor shall it be effective to assign to Owner, Architect/Engineer, or any of the Architect/Engineer's consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract.

B. Standards referenced directly in the Contract Documents or by governing regulations have precedence over non-referenced standards, which are recognized in industry for applicability to the Work.

C. Non-referenced standards recognized in the construction industry are hereby defined, except as otherwise limited in the Contract Documents, to have direct applicability to the work, and will be so enforced for performance of the Work.

D. Publications Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of Contract Documents.

E. Copies of Standards: Provide where needed for proper performance of the work; obtain directly from publication sources.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION (not applicable)

END OF SECTION 010950

SECTION 011000 – SUMMARY

PART 1 - GENERAL

1.1 SCOPE OF WORK

It is the intent of these contract documents to cover providing all labor, materials, equipment and services necessary for and reasonably incidental to the completion of the

ARMSTRONG ELEMENTARY SCHOOL ROOF REPLACEMENT AND MASONRY RESTORATION, HAMPTON, VIRGINIA.

Owner: Hampton City Schools
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Phone: (757) 722-1964

Serving as Architect/Engineer under the contract documents.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

The work may include the removal and replacement of up to approximately 66,607 square feet, of modified multi ply built-up roof and insulation system down to the existing deck, with a new polyisocyanurate insulation system and two ply cold process SBS modified roof system. The new roof will also include new metal flashings at the expansion joints, roof perimeter and copings, all with welded corners and end caps. The project also includes the repointing of a portion of the 1922 prick wall as well as, resetting window headers and repairing cracks in the brick.

To ensure the work can be Substantially Completed by August 23, 2013, the submittals shall be received by the Architect/Engineer within ten (10) calendar days of the Notice to proceed. The submittals will be reviewed and comments returned to the Contractor within five (5) calendar days to minimize negative impact of the construction schedule.

1.3 TYPE OF CONTRACT

A. Project will be constructed under a single prime contract.

1.4 USE OF PREMISES

A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.

B. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Owner Occupancy: Allow for Owner occupancy of Project site and use by the public.
2. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Use of Existing Building: Maintain existing building in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

D. When the Contractor is required to work within the building , he shall be responsible for cleaning the work area at the end of each day and returning it to its original condition. Failure of the Contractor to maintain a clean work environment within the building shall result in the Contractor's pay request being withheld until deficiencies are corrected.

1.5 OWNER'S OCCUPANCY REQUIREMENTS

A. Owner Occupancy: Owner will occupy the premises during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits, unless otherwise indicated.

1. Provide not less than **72** hours' notice to Owner of activities that will affect Owner's operations.
2. The Contractor shall take precautions and protect from damage the grounds, the building, the building interior and the adjacent building structures.

1.6 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed inside the existing building during the following hours and conditions. A workday is defined as Monday through Friday (7:00 AM to 9:00 PM), excluding legal holidays. The Contractor shall notify the Architect/Engineer and the Owner site by 12 noon on Wednesday when the Contractor plans to work on Saturday, Sunday, holidays, or other non-work days outside of the established work day hours. Work performed on the weekend shall be limited to the roof area; no access into the building will be provided unless the contractor agrees to compensate the school for custodian's service.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1.7 MANUFACTURER'S DIRECTIONS

A. Apply, install, connect and erect manufactured items or materials according to the recommendations of the manufacturer when such recommendations are not in conflict with the Contract Documents.

1.8 "OR EQUAL" CLAUSE

A. Whenever a material or article required is specified or shown in the Plans by using the name of the proprietary product or of a particular manufacturer or vendor, any material or article which will perform adequately the duties imposed by the general design will be considered equal and satisfactory providing the material or articles so proposed is of equal substance and function in the Architect's opinion. It shall not be purchased or installed without written approval of the Architect .

B. When more than one material or product is specified by name, the Contractor may select any of the name brands for the use specified.

C. Any substitutions or changes in materials or methods shall be approved by before being used in this Work.

1.9 CONFLICTS BETWEEN SPECIFICATIONS AND DRAWINGS

A. Should any conflict be found in the Contract Documents, the Architect shall interpret or construe the Contract Documents so as to secure the most substantial and complete performance of the Work, within the constraints of the order of precedence established by the General Conditions.

1.10 GOVERNING REGULATIONS / AUTHORITIES

A. General: The procedure followed by Architect has been to contact governing authorities where necessary to obtain information needed for the purpose of preparing Contract Documents, recognizing that such information may or may not be of significance in relation to Contractor's responsibilities for performing the Work. Contact governing authorities directly for necessary information and decisions having a bearing on performance of the Work.

1.11 SUBMITTALS

A. Permits, License and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

1.12 COORDINATION AND MEETINGS

A. General: Prepare and distribute to each entity performing Work at the project site a written memorandum of instructions on required coordination activities, including required notices, reports, and attendance at meetings. Prepare similar memorandum for separate Contractors where interfacing of Work is required. Architect / Engineer will prepare minutes of meetings where Architect / Engineer's presence is required.

B. Preconstruction Conference

1. Schedule a preconstruction conference before starting construction, at a time convenient to the Owner and the Architect / Engineer and within two weeks prior to the start of the construction. Hold the conference at the Project site.
2. Attendees: Authorized representatives of the Owner, Architect / Engineer, the Contractor and his superintendent, major material suppliers, Mechanical subcontractor, Electrical subcontractor and Building Officials(s) having jurisdiction. All Participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
   a. Tentative construction schedule
   b. Critical work sequencing
   c. Designation of responsible personnel
   d. Procedures for processing field decisions and Change Orders
   e. Procedures for processing Applications for Payment
   f. Distribution of Contract Documents
   g. Submittal of Shop Drawings, Product Data, and Samples
   h. Preparation of record documents
   i. Preparation and maintenance of "As-Built" record drawings
   j. Use of the premises
   k. Parking availability
   l. Storage areas
   m. Equipment deliveries and priorities
   n. Safety procedures
   o. First Aid
   p. Security

q. Housekeeping
r. Working hours
s. Smoking policy
t. Emergency contact personnel and phone numbers
u. Sexual offender policy. Refer to Division 1 General Requirements

C. Progress meetings

1. Conduct progress meetings twice a month at the Project Site at the Architects Discretion with a date coordinated with the preparation of payment request. Request representatives (at each meeting) of every entity currently involved in coordination or planning. Contractor shall conduct progress meeting. Minutes will be prepared by the Architect and distributed to everyone in attendance and to others affected by decisions or actions resulting from each meeting, including the Owner. Progress meetings and other construction meetings involving the Contractor, the Architect / Engineer and Owner may be audio recorded at the Owner's option without further notice.

2. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
   a. Contractor's Construction Schedule: Refer to requirements of General Conditions.
   b. Review the present and future needs of each entity present, including the following:
   c. Interface requirements.
   d. Time
   e. Sequences/phasing plan(s).
   f. Status of submittals.
   g. Deliveries.
   h. Access.
   i. Hours of work.
   j. Hazards and risks.
   k. Housekeeping.
   l. Quality and work standards.
   m. Request for Information.
   n. Change Orders.
   o. Review "As Built" record drawings for monthly preparation and maintenance. Architect / Engineer to approve monthly prior to approval of request for payment. Documentation must be acceptable to the Owner or it authorized representative.
   p. Documentation of information for payment request.

D. Schedule Updating: Revise the construction schedule after the progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule with every pay request submitted.

1.13 COMPLIANCE WITH CODES AND REGULATIONS

A. Contractor shall comply with all recognized codes and regulations governing construction, safety precautions and other requirements. In case of conflict, the Virginia Uniform Statewide Building Code and Virginia Fire Safety Regulations shall govern. Comply with all OSHA and Accessibility and ADA requirements.

1.14 COMPLIANCE WITH INDUSTRY STANDARDS

A. Where compliance with two or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement shall be provided. The most stringent shall be

interpreted or construed as being that to secure the most substantial and complete performance of the work as determined by the Architect / Engineer. See Paragraph 1.13 of this section for additional requirements concerning compliance with codes and regulations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to the Contractor. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Quantity allowances.

C. Related Sections:

1. Division 01 Section "Unit Prices" for procedures for using unit prices.
2. Divisions 02 through 49 Sections for items of Work covered by allowances.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes**,** freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.7 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 1: Include in the project base bid the cost of providing 60 SF of replacement of existing damaged sections of metal roof deck. (Infill of roof openings from removal of equipment, drains and accessories is included in the base contract.). The Owner's Representatives shall determine the locations and quantities of deck replacement.

1. Any portion of the allowance not used will be credited to the Owner, via change order, based on the unit price established in the Contractor's bid in Section 01026. Removal and replacement of areas exceeding the 100 SF allowance will be added to the Contract base, via change order, and based on the Contractor's bid unit price. There will be no consideration for additional time to accomplish this work because it is included in the base bid but additional time may be considered for deck replacement in excess of the allowance area.

B. Allowance No. 2: Include in the project base bid the cost of replacing 500 board feet of dimensional wood replacement (i.e. 2x4, 2x6, 2x8, etc) not included in the base contract.

1. Any portion of the allowance not used will be credited to the Owner, via change order, based on the unit price established in the Contractor's bid in Section 01026. Removal and replacement of areas exceeding the 500 board feet allowance will be added to the Contract base, via change order, and based on the Contractor's bid unit price. There will be no consideration for additional time to accomplish this work because it is included in the base bid but additional time may be considered for wood replacement in excess of the allowance area.

END OF SECTION 012100

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Sections:

1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Division 01 Section "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. Item No. 1 - Replace Damaged Metal Roof Deck; Labor and Material

1. Description: Replace existing damaged sections of metal roof deck (Infill of roof openings from removal of equipment, drains and accessories is included in the base contract.). After the 100SF metal deck allowance in the base bid has been used.

a. Unit of Measurement: Square foot of damaged roof deck replaced in excess of Contract requirements and allowances.

B. Item No. 2 – Provide dimensional wood replacement; Labor and Material

1. Description: Replacing a board feet of dimensional wood replacement. After the 500BF dimensional wood replacement allowance in the base bid has been used.
a. Unit of Measurement: Board foot of damaged wood.

C. Item No. 3 – Provide masonry repointing in addition to the work shown in the contract documents; Labor and Material

1. Description: Provide additional repointing.

a. Unit of Measurement: Square foot of roof pointed brick wall.

END OF SECTION 012200

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections include the following:

1. Division 01 Section "Allowances" for procedural requirements for handling and processing allowances.
2. Division 01 Section "Unit Prices" for administrative requirements for using unit prices.
3. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 14 days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor and supervision directly attributable to the change.

d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within 21 days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than 21 days after such authorization.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 .

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.

1.3 SCHEDULE OF VALUES

A. Contractor must coordinate preparation of the Schedule of Values with preparation of the Contractor's Construction Schedule.

B. Each Sub-Contractor shall coordinate preparation of this Schedule of Values for its part of the Work with preparation of the General Contractors' Construction Schedule and Schedule of Values.

C. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:

1. Contractor's construction schedule.
2. Application for Payment form.
3. List of subcontractors.

D. Submit the Schedule of Values to the Architect at the earliest feasible date, but in no case later than 7 days before the date scheduled for submittal of the initial Application for Payment.

E. Format and Content: The project Schedule of Values shall include but is not limited to the following line items; Provide separate lines for labor and material values for items w/ a asterisk before them:

1. Division 1
   a. General Conditions
   b. Superintendent
   c. Bond
   d. Insurances
   e. Utilities/Equipment & Temporary Facilities
   f. Metal Deck Allowance
   g. Wood Blocking Allowance

2. Division 2
   a. Masonry Demolition
   b. Demolition – roof area A
   c. Demolition – roof area B
   d. Demolition – roof area C

e. Demolition – roof area D
f. Demolition – roof area E

3. Division 4
   a. Masonry Repointing
   b. Masonry Repair
   c. Masonry Cleaning

4. Division 5
   a. Miscellaneous Metals
   b. Metal Deck

5. Division 6
   a. *Rough Carpentry - roof area A
   b. *Rough Carpentry - roof area B
   c. *Rough Carpentry - roof area C
   d. *Rough Carpentry - roof area D
   e. *Rough Carpentry - roof area E

6. Division 7
   a. *Roofing - roof area A
   b. *Roofing - roof area B
   c. *Roofing - roof area C
   d. *Roofing - roof area D
   e. *Roofing - roof area E
   f. *Insulation & Cover Board - roof area A
   g. *Insulation & Cover Board - roof area B
   h. *Insulation & Cover Board - roof area C
   i. *Insulation & Cover Board - roof area D
   j. *Insulation & Cover Board - roof area E
   k. *Edge metal (Coping, Gutters, Fascia, etc.)
   l. Miscellaneous Flashings
   m. Sealants
   n. Batt Insulation

F. Identification: Include the following Project identification on the Schedule of Values:

1. Project name and location
2. Name of the Architect
3. Project number
4. Contractor's name and address
5. Date of submittal

G. **Round amounts off to the nearest WHOLE DOLLAR; the total shall equal the Contract Sum**.

H. Schedule Updating: Update and resubmit the Schedule of Values when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT:

A. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.

B. The initial Application for Payment, the Application for Payment at time of Substantial Completion, and the final Application for Payment involve additional requirements.

C. Payment Application Times: Each Application for Payment shall be submitted by the first day of each month. The period of construction Work covered by each Application for Payment is the period from the first to the last day of each month for the duration of the construction period.

D. Payment Application Forms: Use AIA Document G 702 and Continuation Sheets G 703 as the form for Application for Payment.

E. Application Preparation: Complete every entry on the form, including notarization and execution by person authorized to sign legal documents on behalf of the Owner. Incomplete applications will be returned without action.

F. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions have been made.

G. Include amounts of processed Change Orders and Construction Change Directives issued prior to the last day of the construction period covered by the application.

H. Transmittal: Submit **5** executed copies of each Application for Payment to the Architect by means ensuring receipt within 24 hours; one copy shall be complete, including waivers of lien and similar attachments.

I. Transmit each copy with a transmittal form listing attachments, and recording appropriate information related to the application in a manner acceptable to the Architect.

J. Waiver Delays: Submit each Application for Payment with the Contractor's waiver of mechanics lien for the period of construction covered by the application.

K. Submit final Application for Payment with or proceeded by final waivers from every entity involved with performance of Work covered by the application who could lawfully be entitled to a lien.

L. Waiver Forms: Submit waivers of lien on forms, and executed in a manner, acceptable to Owner.

M. Initial Application for Payment: Administrative actions and submittals that must precede submittal of the first Application for Payment include the following:

1. List of subcontractors.
2. List of principal suppliers and fabricators.
3. Schedule of Values.
4. Contractor's Construction Schedule (preliminary if not final).
5. Copies of building permits

N. Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion, submit an Application for Payment; this application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

1. Administrative actions and submittals that shall **precede** this application include:

    a. Occupancy permits and similar approvals.
    b. Final cleaning.
    c. Application for reduction of retainage, and consent of surety.
    d. Advice on shifting insurance coverage.
    e. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
    f. All warranties and guarantees.

O. Final Payment Application: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:

1. Completion of Project closeout requirements.
2. Completion of items specified for completion after Substantial Completion.
3. Assurance that unsettled claims will be settled.
4. Assurance that Work not complete and accepted will be completed without undue delay.
5. Transmittal of required Project construction records to Owner.
6. Proof that taxes, fees and similar obligations have been paid.
7. Removal of temporary facilities and services.
8. Removal of surplus materials, rubbish and similar elements.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01027

SECTION 013300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including:

1. Submittal Schedule
2. Contractor's construction schedule
3. Shop Drawings
4. Product Data
5. Samples
6. Schedule of Values

1.3 Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals.

1.4 SUBMITTAL SCHEDULE

A. The Contractor shall prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for establishment of the Contractor's construction schedule.

1. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.

2. Prepare the schedule in Specification Division order using the schedule shown at the end of this section as a template. Provide the following information for each submittal:

a. Submittal reference number for each item.
b. Review Status
c. Name of subcontractor.
d. Description of the part of the Work covered.

3. Scheduled date for resubmittal.

1.5 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. **Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay**.

B. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

D. Allow two weeks for initial review. If possible, review will be done more quickly. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Architect will promptly advise the Contractor when a submittal being processed must be delayed for coordination. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

E. Submittal Preparation: Place a permanent label, title block or cover sheet on each submittal for identification. Indicate the name of the entity that prepared each submittal.

1. Provide a space approximately 4" x 5" on the label, title block or cover sheet on Submittal to record the Architect's review and approval markings and the action taken. Include the following information on the label, title block or cover sheet, for processing and recording action taken.

a. Project name and date
b. Name and address of Contractor and Supplier
c. Number and title of appropriate Specification Section
d. Drawing number and detail references, as appropriate

F. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Architect using a transmittal form. Submittals received from sources other than the contractor will be returned without action.

1. On the transmittal, record relevant information and requests for data including submittal number and description (Note: Description should include whether it is product data or a shop drawing and what material it relates to, i.e. paint, roofing, sheet metal, etc.). On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. **Include Contractor's certification that information complies with Contract Document requirements. If submittal comes without this certification, it will be returned without review.**

G. Transmittal Form: Use AIA Document G810 or equal.

1.6 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Submission within ten day of the Bid opening: Prepare a simple horizontal bar-chart type Contractor's construction schedule. Submit before the preconstruction roofing conference.

1. Provide a separate time bar for each significant construction activity. Provide continuous vertical line to identify the first working day of each week.

2. Prepare the schedule on a sheet, of sufficient width to show data for the entire construction period.

3. Show each activity in proper sequence, and highlight critical path items.

4. Plan for completion in advance of the date established for Substantial Completion. Indicate Substantial Completion on the schedule to allow time for the Architect's procedures necessary for certification of Substantial Completion.

B. Schedule Updating: Revise the schedule after the progress meeting or at times where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting or when submitting a Request for Payment.

1.7 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.

B. Shop Drawings include fabrication and installation drawings, schedules, and similar drawings. Include the following information:

1. Dimensions
2. Identification of products and materials included
3. Compliance with specified standards
4. Notation of coordination requirements
5. Notation of dimensions established by field measurement

C. Sheet size: Submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 24" x 36".

D. Submittal: Submit one copy for the Owner and One copy for the Architect plus what is needed for the Contractors use, but no less than four copies of all shop drawings for review. For shop drawings submitted in format larger than 8-1/2x11, submit one reproducible copy and three prints. The Architect will retain two, and will return the others marked with action taken and corrections or modifications required. (One of these two copies shall be marked up and maintained as a Record Document in the Architect's file. The remaining copy will be distributed to the Owner upon Project Closeout.) One copy of the submittal is forwarded to the Owner with action taken and the remaining copies are forwarded to the Contractor. See Section 017700, "Closeout Procedures" for additional information on Record Document requirements.

E. Do not use Shop Drawings for construction unless they have been reviewed and approved by the Architect.

1.8 PRODUCT DATA

A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions,

catalog cuts, standard color charts, etc. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings".

B. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:

1. Submittal number
2. Specification division
3. Manufacturer's printed recommendations
4. Compliance with recognized trade association standards
5. Compliance with recognized testing agency standards
6. Application of testing agency labels and seals
7. Notation of dimensions verified by field measurement

C. Do not submit Product Data until compliance with requirements of the contract Documents has been confirmed. Stamp and sign data after reviewing it for compliance to indicate that such a review has been made and that the data does indeed comply with the specified requirements.

D. Submittals: Submit 7 copies of each required submittal; The Architect will retain two and will return the others marked with action taken and corrections or modifications required.

E. Distribution: Furnish copies of approved submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms. Do not proceed with installation until an applicable copy of Product Data is in the installer's possession. Do not permit use of unmarked copies of Product Data in connection with construction.

1.9 SAMPLES

A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Architect's Sample. Include the following:

1. Generic description of the Sample
2. Product name or name of manufacturer
3. Compliance with recognized standards

B. Submit Samples for review of kind, color, pattern and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.

C. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, submit 4 sets; one will be retained marked with the action taken.

Maintain at least one set of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

D. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

1.10 SCHEDULE OF VALUES

A. Submit a schedule of values along with other product submittals consisting of a tabular breakdown of individual elements of the work in sufficient detail to be able to pay for individual items and see where the costs are. Include the project name and address, Contractor's name and address, Contract Purchase Order number, etc. and show the breakdown of what percentage of the total job cost is in each line item. This breakdown will be used for Applications for Payment. Include administrative items such as bond and supervision, insurance, etc. as applicable.

B. Application for payment must be based upon the approved schedule of values and submitted on AIA Application for Payment Forms G702 and G703, only. State of Virginia forms will not be accepted.

1.11 ARCHITECT'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal, mark to indicate action taken, and return promptly. **Compliance with specified characteristics is the Contractor's responsibility.**

B. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

C. Reviewed: Where submittals are marked "Reviewed" that part of the Work covered by the submittal may proceed provided it complies with requirements of the contract Documents; final acceptance will depend upon that compliance.

D. Comments Attached: When submittals are marked "Comments Attached," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance. If resubmittal is also required, promptly respond, in order to acknowledge that requested changes will be made.

E. Rejected: When submittal is marked "Rejected" and "Resubmit" do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark. Do not permit submittals marked "Rejected" and "Resubmit" to be used at the Project site, or elsewhere where Work is in progress.

F. Confirm: Where a submittal is marked "Confirm" the comment indicates an "approved as

noted" status and the Contractor must confirm to the Architect in writing that they will comply with the "as noted" comments before proceeding with that part of the Work.

G. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Reviewed".

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01300

SECTION 015000 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies requirements for temporary services and facilities, including utilities, construction and support facilities, security and protection.

B. Temporary construction and support facilities required include but are not limited to:

1. Water service and distribution
2. Temporary electric power and lights
3. Storage facilities for construction materials.
4. Sanitary facilities, including drinking water.
5. Waste disposal services.

C. Power and water are available at the facility for no cost to the Contractor. However, the Contractor shall make all necessary connections and distribution to serve the project. The Contractor shall remove distribution and connection at the conclusion of the work.

D. Security and protection facilities required include but are not limited to:

1. Temporary fire protection.
2. Barricades, warning signs, lights.
3. Environmental protection.
4. Exhibit Protection
5. Existing Roof Protection

1.3 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:

1. Building Code requirements.
2. Health and safety regulations.
3. Police, Fire Department and Rescue Squad rules.
4. Environmental protection regulations.

B. Standards: Comply with NFPA Code 241, "Building Construction and Demolition Operations", ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition".

C. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly

by AGC and ASC, for industry recommendations.

1.4 PROJECT CONDITIONS

A. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site. Remove asphalt mops from roof at the end of each working day.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. If acceptable to the Architect, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

B. Lumber and Plywood: Comply with requirements in Division 6 Section "Rough Carpentry."

1. For safety barriers, sidewalk bridges, floor protection and similar uses, provide minimum 5/8-inch- (16-mm-) thick exterior plywood.

C. Tarpaulins: Provide waterproof, fire-resistant, UL labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures provide translucent nylon reinforced laminated polyethylene or polyvinyl chloride fire retardant tarpaulins.

D. Protection Blankets: Moving blankets Two-Tone (Blue/Blue) 100% Woven Polyester Moving Blankets, 85lbs per dozen; Size**:** 72" x 80", of sufficient quantity to cover all of the planes under the curved metal roof.

E. Drinking Water Facilities: Provide containerized tap-dispenser bottled-water type drinking water units, including paper cup supply.

F. Temporary Toilet Units: Provide self-contained single-occupant toilet units of the chemical, aerated recirculation, or combustion type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material, and supply unit(s) with toilet tissue.

G. First Aid Supplies: Comply with governing regulations.

H. Fire Extinguishers: Provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

2.2 EQUIPMENT

A. General: Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.

B. Man lifts capable of reaching the highest plane. It is recommended that the contractor visit the facility prior to bidding and examine the location and placement of the display planes and

determine the best equipment for the task.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed.

C. Locate storage trailers, sanitary facilities and other temporary support facilities for easy access, and where approved by the Owner.

D. Maintain temporary support facilities until Substantial Completion, or until personnel will no longer be working on the roof.

E. Sanitary facilities include temporary toilets, wash facilities and drinking water fixtures. Comply with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs, away from the main public entrance.

F. Provide toilet tissue, paper towels, paper cups and similar disposable materials for each facility. Provide covered waste containers for used material.

G. Toilets: Install self-contained toilet units in a location approved by the Owner. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted. Have toilets regularly serviced to keep them clean and in good condition.

H. Collection and Disposal of Waste and Demolition Debris: Collect waste from construction areas and elsewhere daily and remove construction debris from the site weekly or as soon as containers are nearly fully. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F (27 deg C). Handle hazardous, dangerous, or unsanitary waste by containerizing properly. Dispose of material in a lawful manner.

3.2 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Temporary Fire Protection: Comply with NFPA 10 "Standard for Portable Fire Extinguishers," and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations." Locate fire extinguishers near tankers and kettles and on the roof during roofing operations.

B. Barricades: Provide temporary barricades where roofing operations are going on to keep people away.

C. Security: Where materials and equipment must be stored, and are of value or attractive for theft,

provide a secure lockup. Remove all equipment from around the building at the end of each working day that would provide a means of egress to the roof, and lock up asphalt kettles at days end.

D. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment, which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.

E. Exhibit Protection: The Contractor is expected to provide the museum personnel a man-lift with operator, protection blankets and tarps so that museum personnel can cover and uncover the exhibits suspended from the roof structure and other floor mounted displays. The highest plane is 70 feet above the first floor. A layout of the planes and their approximate heights are included in the drawings. The protection activity can only be done by museum personnel and will last approximately one week to cover and uncover for each of the three front roof areas.

The Contractor will be required to scaffold over the Apollo capsule. Plywood, blankets and traps will then be placed over the capsule.

1. Breach of unprotected portion of the building: In the event that there is a breach into an occupied and or unprotected portion of the facility, as direct result of roofing activities, the Contractor shall immediately notify the Owner, the Owner's representative and the Architect of the breach and immediately begin to secure the breach and clean up the affected area. The Contractor shall not clean ANY debris off ANY exhibit without prior written approval from the Owner and only under the direct supervision of qualified museum personnel. The Contractor shall not leave the site for the day until breach is secured and all clean-up complete and said clean up is reviewed by the Owner's representative of the Architect.

F. Existing Roof Protection: The Contractor will provide protection for the existing roof during this contract. This protection will be at a minimum 4'-0" x 8'-0" sheets of one half inch thick CDX plywood laid out in a tile pattern over the existing roof adjacent to the metal roof work. At no time shall the Contractor traverse an existing roof area without this protection in place. The corners of the plywood sheets shall also be trimmed to create a 4 inch champer. No material fabrication or storage shall occur on the existing roof. Scaffolding will be allowed to be erected on the existing roof to access the roof eaves.

G. Egress door protection: The Contractor shall provide covered overhead protection at all egress doors, parking areas and sidewalks where roof work is occurring above. Said protection shall remain in place for the entire period of time that roof work is occurring. The Contractor shall coordinate with the Owner before the installation and removal of protection measures.

3.3 OPERATION, TERMINATION AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse. Any work on the interior of the building will be coordinated with the museum personnel, and by doing so will be required to sign in and out at the first floor security desk.

B. Maintenance: Maintain facilities in good operating condition until removal.

C. Termination and Removal: Unless the Architect requests that it be maintained longer, remove each temporary facility at Substantial Completion.

END OF SECTION 015000

SECTION 017700 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specified administrative and procedural requirements for project closeout, including:

1. Establishment of Substantial Completion
2. Final Acceptance
3. Inspection procedures
4. Project record document submittal
5. Submittal of warranties
6. Final cleaning and Repairs

B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions-1 through 16.

1.3 SUBSTANTIAL COMPLETION

A. General: **It is the Contractor's responsibility to initiate procedures for obtaining a Certificate of Substantial Completion. This date of Substantial Completion must be before the expiration of the Contract Time, or liquidated damages will be assessed. At Substantial Completion, all work must be complete with the exception of punch list items. "Substantial Completion" is defined in the supplemental conditions section 00710.**

B. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete. Failure to provide a complete punchlist will be grounds for the Architect not to conduct Substantial Completion inspection and will prevent the issuance of a Certificate of Substantial Completion.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Complete final cleaning requirements, including touchup painting.
7. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

C. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled

requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued. Work that is incomplete shall not be included on the punchlist for substantial completion and shall be completed prior to initiating substantial completion procedures.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.
3. If more than two inspections are needed for the issuing of the Certificate of Substantial Completion, an amount of $150 will be deducted from the amount owed the Contractor for each subsequent inspection required of the Architect to verify that the Contractor's work is completed.

D. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. If not already provided, include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.

E. Submit specific warranties and guarantees, final certifications, and similar documents

F. Advise Owner of pending insurance changeover requirements.

G. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities; include occupancy permits, operating certificates and similar releases.

H. Submit record drawings, and similar final record information.

I. Complete final clean up requirements, including the restoration of any damage to the building or site, which occurred during the course of construction.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three copies of list. Include identification of each roof area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of roof areas in sequential order.
2. Organize items applying to each roof area by major element, including categories for roof panels, edge fascia, rake trim, etc.
3. Include the following information at the top of each page:
   a. Project name.
   b. Date.
   c. Name of Architect.
   d. Name of Contractor.
   e. Page number.

1.5 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

B. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

C. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

D. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the Architect.

E. Submit consent of surety to final payment.

F. Submit a final liquidated damages settlement statement, if applicable.

G. Reinspection Procedures: The Architect will reinspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Architect. Upon completion of reinspection, the Architect will prepare a certificate of final acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance. If necessary, reinspection will be repeated. **If more than two inspections are needed following the issuing of the Certificate of Substantial Completion, an amount of $150 will be deducted from the amount owed the Contractor for each subsequent inspection required of the Architect to verify that the Contractor's work is completed**.

1.6 RECORD DOCUMENT SUBMITTALS

A. Record Drawings: The Contractor shall maintain a clean, undamaged set of blue or black line white-prints of contract Drawings and Shop Drawings during construction activities. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. **It is the Contractor's responsibility to maintain this record and the records indicated below. Failure to keep record of the information required herein will result in additional charges to the Contractor at Final Completion, as required to establish this information from other sources.**

1. Make record drawings to show locations and quantities of any roof deck replacement.

2. Mark record sets with red erasable pencil.

3. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings, such as conditions uncovered during the course of the work.

4. Upon completion of the Work, submit Record Drawings to the Architect for the Owner's record.

5. Content: Types of items requiring marking include, but are not limited to, the following:

   a. Dimensional changes to Drawings.
   b. Revisions to details shown on Drawings.
   c. Changes made by Change Order.

d. Changes made following Architect's written orders.
e. Details not on the original Contract Drawings.
f. Field records for variable and concealed conditions.
g. Measured areas of deck replacement and deck painting.
h. Location of wood replacement.
i. Record information on the Work that is shown only schematically.

B. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Field Orders, Change orders and Modifications issued in printed form during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data. **Upon completion of the Work, submit record Specifications to the Architect for the Owner's record**.

C. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to shown significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work, which cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications. **Upon completion of mark-up, submit complete set of record Data to the Architect for the Owner's record**s.

D. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records including such documents as daily reports, and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect for the Owner's records.

E. Maintenance Information: Submit information to the Owner from the manufacturer of the roof membrane describing proper maintenance procedures for roof components. Bind information into 3 ring binders along with warranties, etc.

1.7 SUBMITTAL OF WARRANTIES

A. Submit one original and one copy of the Roof Manufacturers warranty and two original copies of the Roof Contractor warranty.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 FINAL CLEANING AND REPAIRS

A. General: General cleaning during construction is required by the General Conditions and included in Section "Temporary Facilities".

B. Cleaning: Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion:

C. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances caused by construction operations. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

D. Clean all exposed building components, whether existing or new of any stains or spills that occurred during construction.

E. Repairs: Repair any damage to the property caused by construction operations to condition prior to start of construction in accordance with requirements of these specifications. Fill any holes or ruts created during construction with topsoil and reestablish grass in these and any other areas where grass has been damaged during the course of the work.

F. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

G. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

END OF SECTION 017700

SECTION 024119 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building or structure.

B. Related Sections include the following:

1. Division 01 Section "Summary" for use of premises and Owner-occupancy requirements.
2. Division 01 Section "Temporary Facilities" for temporary construction and environmental-protection measures for selective demolition operations.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Locations of proposed dust- and noise-control temporary partitions and means of egress.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
6. Means of protection for items to remain and items in path of waste removal from building.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1. Comply with submittal requirements in Division 01 Section "Construction Waste Management and Disposal."

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.6 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

1. Comply with requirements specified in Division 01 Section "Summary."

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove the following items:

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Hazardous materials are present in construction to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.
2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs and preconstruction videotapes.

1. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities "

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
6. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
7. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Roofing: Remove no more existing roofing than can be covered in one day by new roofing and so that building interior remains watertight and weathertight. Refer to Division 07; for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to deck.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 049010 - CLAY MASONRY RESTORATION AND CLEANING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes restoration and cleaning of brick as follows:

1. Repairing clay masonry, including replacing damaged units.
2. Repointing mortar joints.
3. Removing plant growth.
4. Cleaning exposed clay masonry surfaces.

1.2 DEFINITIONS

A. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.

B. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use.

B. Samples: For each exposed material required for replacing or repairing existing materials.

C. Qualification Data: For restoration specialists.

1.4 QUALITY ASSURANCE

A. Preconstruction Testing Service: Engage a qualified independent testing agency to test the following:

1. Replacement Brick: Test according to ASTM C 67 for compressive strength, 24-hour cold-water absorption, 5-hour boil absorption, saturation coefficient, and initial rate of absorption (suction).
2. Existing Brick: Test according to ASTM C 67 for compressive strength, 24-hour cold-water absorption, 5-hour boil absorption, saturation coefficient, and initial rate of absorption (suction). Carefully remove from locations designated by Architect.

B. Mockups: Prepare mockups of restoration and cleaning as follows to demonstrate aesthetic effects and qualities of materials and execution.

1. Patch three small areas as directed for each type of masonry material indicated to be patched.
2. Clean an area approximately 25 sq. ft. in area for each type of clay masonry and surface condition.
3. Rake out joints in two separate areas approximately 36 inches high by 72 inches wide for each type of repointing required and repoint one of the two areas.

C. Mortar Testing and analysis: The Contractor shall test mortar per ASTM C1324 Testing/Custom Blending, and match the composition and color, but at no time shall the Contractor use more than 20% Portland cement in their mortar mix.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
2. Products: Subject to compliance with requirements, provide one of the products specified.
3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
4. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 MASONRY MATERIALS

A. Face Brick and Accessories: Provide face brick and accessories, including specially molded, ground, cut, or sawed shapes.

1. Provide units with colors, surface texture, size, and shape to match existing brickwork and with physical properties not less than those determined from preconstruction testing of selected existing units.

B. Building Brick: ASTM C 62; Grade SW, MW, or NW, except Grade SW where in contact with earth; of same vertical dimension as face brick; for masonry work concealed from view.

C. Portland Cement: ASTM C 150, Type I or Type II.

1. Provide white cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

D. Hydrated Lime: ASTM C 207, Type S.

E. Mortar Sand: ASTM C 144, unless otherwise indicated.

1. Color: Provide natural sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
2. For pointing mortar, provide sand with rounded edges.
3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands, if necessary, to achieve suitable match.

F. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes.

G. Water: Potable.

2.3 PAINT REMOVERS

A. Covered or Skin-Forming Alkaline Paint Remover: Manufacturer's standard covered or skin-forming alkaline formulation.

1. Available]Products:

a. American Building Restoration Products, Inc.; Grip 'N Strip 800 F.A.
b. Diedrich Technologies Inc.; 404 Rip-Strip.
c. Dumond Chemicals, Inc.; Peel Away 1 System.
d. ProSoCo; Enviro Strip #2.

B. Solvent-Type Paint Remover: Manufacturer's standard water-rinsable, solvent-type gel formulation.

1. Products:

a. American Building Restoration Products, Inc.; No. 3 Grip 'N Strip.
b. Diedrich Technologies Inc.; 505 Special Coatings Stripper.
c. Dominion Restoration, Inc.; Dominion Multi-Layer Paint & Graffiti Remover.
d. Dumond Chemicals, Inc.; Peel Away 2.
e. Hydrochemical Techniques, Inc.; Hydroclean Solvent Paint Remover (HT-300).
f. Price Research, Ltd.; Price Strip-All.
g. ProSoCo; Sure Klean Fast Acting Paint Stripper.

C. Low-Odor, Solvent-Type Paint Remover: Manufacturer's standard low-odor, water-rinsable solvent-type gel formulation, containing no methanol or methylene chloride.

1. Products:

a. American Building Restoration Products, Inc.; 800 No Lye Grip 'N Strip Super Bio Strip Gel or Super Bio Strip Paste.
b. Dumond Chemicals, Inc.; Peel Away 6.
c. ProSoCo; Enviro Klean NMC or Enviro Strip #3.

2.4 CLEANING MATERIALS

A. Water for Cleaning: Potable.

B. Hot Water: Heat water to a temperature of 140 to 160 deg F.

C. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups of tetrasodium polyphosphate (TSPP), 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

D. Job-Mixed Mold, Mildew, and Algae Remover: Solution prepared by mixing 2 cups of tetrasodium polyphosphate (TSPP), 5 quarts of 5 percent sodium hypochlorite (bleach), and 15 quarts of hot water for every 5 gal. of solution required.

E. Nonacidic Gel Cleaner: Manufacturer's standard gel formulation, with pH between 6 and 9, that contains detergents and chelating agents and is specifically formulated for cleaning masonry surfaces.

1. Products:

a. Price Research, Ltd.; Price Marble Cleaner-Gel.
b. ProSoCo; Sure Klean 942 Masonry Cleaner.

F. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing organic soiling from polished stone, brick, aluminum, plastics, and wood.

1. Products:

a. Dominion Restoration, Inc.; Bio-Cleanse.
b. Dumond Chemicals, Inc.; Safe n' Easy Architectural Cleaner/Restorer.
c. Price Research, Ltd.; Price Non-Acid Masonry Cleaner.
d. ProSoCo; Enviro Klean Restoration Cleaner.

G. Mild Acidic Cleaner: Manufacturer's standard mildly acidic cleaner containing no hydrochloric, hydrofluoric, or sulfuric acid; or chlorine bleaches.

1. Products:

a. Diedrich Technologies Inc.; Envirorestore 100.
b. Dominion Restoration, Inc.; DR-60 Stone and Masonry Cleaner.
c. Dumond Chemicals, Inc.; Safe n' Easy Heavy Duty Restoration Cleaner.
d. ProSoCo; Sure Klean Light-Duty Restoration Cleaner.

H. Acidic Cleaner: Manufacturer's standard acidic masonry restoration cleaner composed of hydrofluoric acid blended with other acids, detergents, wetting agents, and inhibitors.

1. Products:

a. American Building Restoration Products, Inc.; 801 Heavy Duty Masonry Cleaner.
b. Diedrich Technologies Inc.; 101 Masonry Restorer or 101G Granite, Terra Cotta, and Brick Cleaner.
c. Hydrochemical Techniques, Inc.; Hydroclean Brick, Granite, Sandstone and Terra Cotta Cleaner (HT-626).
d. Price Research, Ltd.; Price Heavy Duty Restoration Cleaner or Price Restoration Cleaner.
e. ProSoCo; Sure Klean Heavy-Duty Restoration Cleaner Sure Klean 1028 Restoration Cleaner or Sure Klean Restoration Cleaner.

2.5 MISCELLANEOUS MATERIALS

A. Masonry Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching masonry, is vapor- and water permeable, exhibits low shrinkage, and develops high bond strength to all types of masonry.

1. Formulate patching compound to match masonry units being patched.

B. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.

1. Products:

a. American Building Restoration Products, Inc.; LM 130 Acid Shield.
b. Diedrich Technologies Inc.; Diedrich Acid Guard.
c. Price Research, Ltd.; Price Mask.
d. ProSoCo; Sure Klean Strippable Masking.

2.6 MIXES

A. Mortar Mixes: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Mix materials in a clean, mechanical batch mixer.

1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.
2. Mortar Pigments: Do not exceed a pigment-to-cement ratio of 1:10 by weight.

B. Do not use admixtures of any kind in mortar, unless otherwise indicated.

C. Pointing Mortar for Brick: [1 part portland cement, 2 parts lime, and 6 parts sand] [1 part portland cement, 6 parts lime, and 12 parts sand] <Insert required proportions>.

1. Add mortar pigments to produce mortar colors required.

D. Rebuilding (Setting) Mortar: Same as pointing mortar.

E. Rebuilding (Setting) Mortar: Comply with ASTM C 270, Proportion Specification, Type N, unless otherwise indicated; with cementitious material content limited to portland cement and lime.

F. Chemical Cleaning Solutions: Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical cleaner manufacturer.

1. Acidic Cleaner Solution for Brick: Dilute with water to produce hydrofluoric acid content of 3 percent or less.
2. Acidic Cleaner Solution for Terra Cotta: Dilute with water to concentration demonstrated by testing that does not etch or otherwise damage terra cotta surface.

2.7 Tools and Accessories

A. Shims: Hard Plastic; removable; size and shape as required for temporary support of stone or brick.

B. Chisels: Carbide-tipped stone carving chisels.

1. Hand Chisels
2. Barre ½" type B short stroke pneumatic carving tool.

C. Pointing Irons: Width slightly less than joint width. Various widths required to suit project conditions.

D. Brushes of various sizes for cleaning raked-out joints.

E. Garden sprayer, water hose, and shop-type vacuum for cleaning raked-out joints.

F. Hand water mister bottle and garden sprayer for curing, cleaning, and finishing pointed joints.

G. Grinders, when approved:

1. Blade width limited to 1/16"

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.

B. Prevent chemical cleaning solutions from coming into contact with pedestrians, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

1. Cover adjacent surfaces with materials that resist chemical cleaners used unless chemical cleaners will not damage surfaces. Use materials that contain only waterproof, UV-resistant adhesives. When no longer needed, promptly remove masking to prevent adhesive staining.
2. Keep wall wet below area being cleaned to prevent streaking from runoff.

3.2 MASONRY REMOVAL, REPLACEMENT, AND PATCHING

A. At locations indicated, remove masonry units that are damaged, spalled, or deteriorated. Carefully demolish or remove entire units from joint to joint, without damaging surrounding masonry, in a manner that permits replacement with full-size units.

B. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Remove in an undamaged condition as many whole bricks as possible.

1. Remove mortar, loose particles, and soil from brick by cleaning with hand chisels, brushes, and water.

D. Clean bricks surrounding removal areas by removing mortar, dust, and loose particles.

E. Brick Replacement:

1. Install replacement brick into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw to cut masonry with clean, sharp, unchipped edges.
2. Lay brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min.. Maintain joint width to match existing joints.

    a. Tool exposed mortar joints to match joints of surrounding existing brickwork.
    b. surrounding existing terra cotta.

F. Masonry Unit Patching: Remove loose material from masonry surface. Remove additional material so patch will not have feathered edges and will be at least 1/4 inch thick.

1. Rinse surface to be patched and leave damp, but without standing water.
2. Brush-coat surfaces with slurry coat of patching compound.
3. Place patching compound in layers not less than 1/4 inch or more than 2 inches thick. Roughen surface of each layer to provide a key for next layer.
4. Trowel, scrape, or carve surface of patch to match texture and surface plane of surrounding masonry.
5. Keep each layer damp for 72 hours or until patching compound has set.
6. After final layer of patching compound has cured, apply glaze replacement to terra cotta. Apply two or more coats, as needed, to match glaze of adjacent terra cotta units.

3.3 CLEANING

A. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other.

B. Use only those cleaning methods indicated for each masonry material and location.

1. Do not use wire brushes.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip.
3. For chemical cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.
4. For water spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.

C. Removing Plant Growth: Completely remove plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil and debris from open masonry joints to whatever depth they occur.

D. Chemical Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical cleaner manufacturer's written instructions; use brush or spray application methods, at Contractor's option. Do not spray apply at pressures exceeding 50 psi.

Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

E. Paint Removal with Covered or Skin-Forming Alkaline Paint Remover:

1. Apply paint remover to dry, painted masonry.
2. Apply cover, if required by manufacturer, per manufacturer's written instructions.
3. Allow paint remover to remain on surface for period recommended by manufacturer.
4. Scrape off paint and remover and collect for disposal.
5. Rinse with cold water applied by low-pressure spray.
6. Apply acidic cleaner, while surface is still wet, using low-pressure spray or soft-fiber brush. Let cleaner remain on surface for period recommended by chemical cleaner manufacturer.
7. Rinse with cold water applied by low-pressure spray.

F. Paint Removal with Solvent-Type Paint Remover:

1. Apply thick coating of paint remover with brush or deep-nap roller.
2. Allow paint remover to remain on surface for period recommended by manufacturer. Agitate periodically with stiff-fiber brush.
3. Rinse with cold water applied by low-pressure spray.

G. Detergent Cleaning: Use for brick.

1. Wet masonry with cold water applied by low-pressure spray.
2. Scrub masonry with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing.
3. Rinse with cold water applied by low-pressure spray.

H. Mold, Mildew, and Algae Removal:

1. Wet masonry with cold water applied by low-pressure spray.
2. Apply mold, mildew, and algae remover by brush or low-pressure spray.
3. Scrub masonry with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing.
4. Rinse with cold water applied by low-pressure spray.

I. Nonacidic Gel Chemical Cleaning: Use for brick.

1. Wet masonry with cold water applied by low-pressure spray.
2. Apply nonacidic gel cleaner in 1/8-inch thickness by brush, working into joints and crevices. Apply quickly and do not brush out excessively so area will be uniformly covered with fresh cleaner and dwell time will be uniform throughout area being cleaned.
3. Let cleaner remain on surface for period recommended by manufacturer.
4. Remove bulk of nonacidic gel cleaner by squeegeeing into containers for disposal.
5. Rinse with cold water applied by low-pressure spray.

J. Nonacidic Liquid Chemical Cleaning:

1. Brick: Use nonacidic liquid cleaner.

2. Wet masonry with cold water applied by low-pressure spray.
3. Apply cleaner to masonry in two applications by brush or low-pressure spray. Let cleaner remain on surface for period recommended by chemical cleaner manufacturer.
4. Rinse with cold water applied by low-pressure spray

3.4 REPOINTING MASONRY

A. Rake out and repoint mortar joints as follows:

1. Remove mortar from joints to depth of 2 times joint width, but not less than 1/2 inch or not less than that required to expose sound, unweathered mortar. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar.
2. Cut out mortar by hand with chisel and mallet.
3. Cut out center of mortar bed joints using angle grinders with diamond-impregnated metal blades only after . Remove remaining mortar by hand with chisel and mallet. Strictly adhere to written quality-control program. Quality-control program shall include provisions for demonstrating ability of operators to use tools without damaging masonry, supervising performance, and preventing damage due to worker fatigue.
4. Rinse masonry-joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen masonry-joint surfaces before pointing.
5. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer. Where existing bricks have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces.
6. When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.

B. Cure mortar by maintaining in thoroughly damp condition for at least 72 hours including weekends and holidays.

1. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.

3.5 FINAL CLEANING

A. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use wood scrapers, stiff-nylon or -fiber brushes, and clean water, spray applied at low pressure.

1. Do not use metal scrapers or brushes.
2. Do not use acidic or alkaline cleaners.

END OF SECTION 049010

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Metal ladders.

B. Products furnished, but not installed, under this Section:

   1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.3 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

   1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 SUBMITTALS

A. Product Data: For the following:

   1. Paint products.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.

   1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

C. Qualification Data: For qualified professional engineer.

D. Welding certificates.

E. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.

1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

D. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

E. Post-Installed Anchors: chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

1. Products: Subject to compliance with requirements, provide the following:

a. 2K Epoxy Zinc Rich Primer Catalyst, by PPG Industries.

2.5 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

C. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 METAL LADDERS

A. General:

1. Comply with ANSI A14.3 unless otherwise indicated.

B. Steel Ladders:

1. Space siderails 20 inches apart unless otherwise indicated.
2. Siderails: Continuous, 3/8-by-3-inch
3. steel flat bars, with eased edges.
4. Rungs: 3/4-inch- diameter steel bars.
5. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.

6. Provide nonslip surfaces on top of each rung, either by coating rung with aluminum-oxide granules set in epoxy-resin adhesive or by using a type of manufactured rung filled with aluminum-oxide grout.

7. Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles. Limit openings in gratings to no more than 3/4 inch (19 mm) in least dimension.
8. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets.
9. Galvanize exterior ladders, including brackets and fasteners.

2.8 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.9 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

3.3 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Wood blocking and nailers.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA C2.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat all rough carpentry, unless otherwise indicated.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

C. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.4 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners of Type 304 stainless steel.

B. Power-Driven Fasteners: NES NER-272.

C. Wood Screws: ASME B18.6.1.

D. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking,and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Do not splice structural members between supports, unless otherwise indicated.

D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

E. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use copper naphthenate for items not continuously protected from liquid water.

G. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

H. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

I. Provide Felt between treated lumber and metal deck and framing.

3.2 PROTECTION

A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 070150- PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Roof tear-off.
2. Removal of base flashings.

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Existing Membrane Roofing System: Gravel-surface BUR roofing membrane, roof insulation, surfacing, and components and accessories between deck and roofing membrane.

C. Roof Tear-Off: Removal of existing membrane roofing system from deck.

D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

E. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer of new membrane roofing system specified in Division 7 Section "Modified Bituminous Membrane Roofing."

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Reroofing Conference: Conduct conference at Project site.

1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing system manufacturer's representative; deck Installer; roofing Installer including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing system tear-off and replacement including, but not limited to, the following:
    a. Reroofing preparation, including membrane roofing system manufacturer's written instructions.

b. Temporary protection requirements for existing roofing system that is to remain during and after installation.
c. Existing roof drains and roof drainage during each stage of reroofing, and roof drain plugging and plug removal requirements.
d. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
e. Existing deck removal procedures and Owner notifications.
f. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
g. Structural loading limitations of deck during reroofing.
h. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect reroofing.
i. HVAC shutdown and sealing of air intakes.
j. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
k. Governing regulations and requirements for insurance and certificates if applicable.
l. Existing conditions that may require notification of Architect before proceeding.

1.6 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately below reroofing area. Conduct reroofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.
   1. Coordinate work activities daily with Owner’s Representative so Owner can place protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area.

B. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

D. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.

E. Limit construction loads on roof, including rooftop equipment wheel loads and uniformly distributed loads of stored or demolished materials.

F. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.

G. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS

2.1 AUXILIARY REROOFING MATERIALS

A. General: Auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of new membrane roofing system.

B. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

B. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

C. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

D. Verify that rooftop utilities and service piping have been shut off before beginning the Work.

3.2 ROOF TEAR-OFF

A. General: Notify Owner's Representative each day of extent of roof tear-off proposed for that day.

B. Only tear off a portion of roof that can be reroofed with permanent roof in that day. At no time shall the roof be left overnight with temporary roofing on it, unless interrupted by unforeseen rain.

C. Remove aggregate ballast from roofing membrane. Dispose of legally.

D. Remove pavers and accessories from roofing membrane.

E. Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.

1. Remove cover boards, roof insulation and substrate boards.
2. Remove fasteners from deck or cut fasteners off slightly above deck surface.

3.3 DECK PREPARATION

A. Inspect deck after tear-off of membrane roofing system.

B. If broken or loose fasteners that secure deck panels to one another or to structure are observed or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.

C. If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

3.4 EXISTING BASE FLASHINGS

A. Remove existing base flashings around parapets, curbs, walls, and penetrations.

1. Clean substrates of contaminants such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish.

3.5 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION 070150

SECTION 075200 - MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 SCOPE

A. This Section includes the following:
   1. Tear off and disposal of existing membrane roof.
   2. Roof membrane application:
      a. 2-ply MB roof, cold adhesive applied for slope greater than 1/8 inch/foot
         1) NRCA #MBS-2-I-L-M (SBS)
      b. Liquid-applied roof for slope less than 1/8 inch/foot
   3. Roof flashing application.
   4. Incorporation of sheet metal flashing components and roofing accessories into the roof system.
   5. Infrared survey of completed roof system.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Division 5 Section “Steel Deck” for acoustic roof deck insulation requirements.
   2. Division 6 Section “Rough Carpentry” for sheathing, composite insulated sheathing, wood nailers, curbs, and wood cants.
   3. Division 7 Section “Preparation for Re-Roofing” for existing roof tear-off.
   4. Division 7 Section “Sheet Metal Flashing and Trim” for metal counter flashings, gravel stops and fascias. Materials specified in this section for roofing application shall form part of the Total System Warranty of the roof manufacturer/installer.
   5. Division 22 Section “Plumbing Systems” for roof drains.

1.3 REFERENCE STANDARDS

A. References in these specifications to standards, test methods, codes etc., are implied to mean the latest edition of each such standard adopted. The following is an abbreviated list of associations, institutions, and societies which may be used as references throughout these specifications.
   1. ASTM: American Society for Testing and Materials
   2. FM: Factory Mutual Engineering and Research
   3. NRCA: National Roofing Contractors Association
   4. OSHA: Occupational Safety and Health Administrations
   5. SMACNA: Sheet Metal and Air Conditioning Contractors National Association
   6. UL: Underwriters Laboratories

1.4 DESCRIPTION OF WORK

A. The basic work descriptions (components, layering and attachment methods) required in this specification are referenced below. See also Parts 2 and 3 for specific products, preparation, application and details.

1. Project Type: Re-roof
2. Deck: Metal and Tectum
3. Slope: Varies
4. Insulation: Minimum 2 layers of 2.0 inch Polyisocyanurate: Mechanically attach first layer of insulation; secure subsequent layers of insulation and coverboard with cold-applied adhesive. Minimum of R 25 is required.
5. Cover Board: 1/2" SECUROCK or options as specified
6. Insulation - Acoustic Steel for Deck: Sound absorbing strip of glass or mineral fiber for depth of deck, in Division 5 Section “Steel Deck.”
7. **MB Roof System (Primary)** : NRCA #MBS-2-I-L-M
8. Flashing System: Veral Aluminum, cold adhesive applied.
9. Specified Guarantee: Twenty Year Roof Membrane flashings, gravel stop and fascia, “Full System Warranty” Guarantee with an insulation inclusion addendum. No exclusions for ponding water are allowed in the Guarantee in areas to receive the liquid-applied roofing (PMMA or alternate chemistry waterproofing) system.
10. Approved Manufacturers: The following manufacturers are approved to bid providing they meet the requirements of these specifications:
    a. Siplast
    b. SOPREMA
    c. Johns Manville.

1.5 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' “RoofNav” for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals markings.

1. Fire/Windstorm Classification: Class 1A-90.

1.6 SUBMITTALS

A. Submit concurrently with Division 7 Section “Sheet Metal Flashing and Trim” for roofing system components included under total system warranty.

B. Product Data, including manufacturer's technical product data, installation instructions, and recommendations for each type of roofing product required. Include data substantiating that materials comply with requirements.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.

3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

D. Samples of the following:

1. Roofing membrane base sheet.
2. Membrane granular-surfaced cap sheet.
3. Aluminum-foil surfaced flashing sheet.
4. Liquid-applied roofing membrane for low-slope (positive drainage) applications.
5. Roof insulation.
6. Walkway pads or rolls.
7. Six insulation fasteners of each type, length, and finish.

E. Provide evidence and description of manufacturer's quality control/quality assurance program for the primary roofing products supplied. The quality assurance program description shall include all methods of testing for physical and mechanical property values. Provide confirmation of manufacturer's certificate of analysis for reporting the tested values of the actual material being supplied for the project prior to issuance of the specified guarantee.

F. Descriptive list of the materials proposed for use.

G. Evidence of Underwriters' Laboratories Class A acceptance of the roofing system. No other testing agency approvals will be accepted.

H. Letter from the primary roofing manufacturer confirming the number of years it has directly manufactured the primary roofing system under the trade name and/or trademarks as proposed.

I. List of five (5) of the manufacturer's projects, located in Virginia, of equal size and degree of difficulty, which have been performing successfully for a period of at least five (5) years.

J. Complete list of material physical and mechanical properties for each sheet including: weights and thicknesses; low temperature flexibility; breaking load; ultimate elongation; dimensional stability; compound stability; granule embedment and resistance to thermal shock (foil faced products).

K. Sample copy of the specified guarantee.

L. Letter from the primary roofing manufacturer confirming that the installer is an acceptable Contractor authorized to install the proposed system and was an acceptable authorized contractor at date of bid.

M. Letter from the primary roofing manufacturer stating that the application will comply with the Manufacturer's requirements in order to qualify the project for the specified guarantee.

N. Submittals Prior to Project Close-Out:

1. Provide a Certificate of Analysis from the testing laboratory of the primary roofing materials manufacturer, confirming the physical and mechanical properties of the roofing membrane components. Testing shall be performed in accordance with the parameters published in ASTM D 5147 and will indicate Quality Assurance/Quality Control data as required to meet the specified properties. A separate Certificate of Analysis is required for each production run of material and shall indicate the following information:
    a. Material type
    b. Lot number
    c. Production date
    d. Dimensions and Mass (indicate the lowest values recorded during the production run);

1) Roll length
2) Roll width
3) Selvage width
4) Total thickness
5) Thickness at selvage
6) Weight

e. Physical and Mechanical Properties:
1) Low temperature flexibility
2) Breaking load
3) Ultimate elongation
4) Dimensional stability
5) Compound stability
6) Granule embedment
7) Resistance to thermal shock (foil faced products)

1.7 QUALITY ASSURANCE

A. Acceptable Products: Provide primary roofing products, including each type of sheet, all manufactured in the United States, supplied by a single manufacturer which has been successfully producing the specified types of primary products for not less than ten (10) years. Provide secondary or accessory products which are acceptable to the manufacturer of the primary roofing products.

B. Product Quality Assurance Program: Provide primary roofing materials manufactured under a quality control/quality assurance program. A certificate of analysis for reporting/confirming the tested values of the actual material being supplied for the project will be required prior to project close-out.

C. Agency Approvals: The proposed roof system shall conform to the following requirements. No other testing agency approvals will be accepted.

1. Underwriters Laboratories Class A acceptance of the proposed roofing system .

D. Acceptable Contractor: Have a minimum of five (5) years experience in successfully installing the proposed roofing materials and be certified in writing by the roofing materials manufacturer to install the primary roofing products.

E. Project Acceptance: Submit a completed manufacturer's application for roof guarantee form along with shop drawings of the roofs showing all dimensions, penetrations, and details. The form shall contain all the technical information applicable to the project including deck types, roof slopes, base sheet and/or insulation assemblies (with method of attachment, and fastener type), and manufacturer's membrane assembly proposed for installation. The form shall also contain accurate and complete information requested including proper names, addresses, zip codes and telephone numbers. The project must receive approval, through this process, prior to shipment of materials to the project site.

1. The Manufacturer shall provide on-the-job inspections at a frequency of every other week and provide technical assistance, and application guidance as necessary.

F. Scope of Work: The work to be performed under this specification shall include but is not limited to the following: Attend necessary project meetings and furnish competent and full time supervision, experienced roof mechanics, all materials, tools, and equipment necessary to complete, in an acceptable manner, the roof installation in accordance with this specification. Comply with the latest written application instructions of the manufacturer of the primary roofing products. In addition, application practice shall comply with requirements and

recommendations contained in the latest edition of the Handbook of Accepted Roofing Knowledge (HARK) as published by the National Roofing Contractors Association, amended to include the acceptance of a phased roof system installation. The responsibility for providing a complete warranted, weatherproof roof shall be solely upon the Contractor.

G. Manufacturer Requirements: The primary roofing materials manufacturer shall provide direct trained company personnel to attend necessary job meetings, perform periodic inspections as necessary, and conduct a final inspection upon successful completion of the project.

H. Recommended Maintenance: In addition to the guarantee, furnish to the Owner the manufacturer's printed recommendations of proper maintenance of the specified roof system including inspection frequencies, penetration addition policies, temporary repairs, and leak call procedures.

1.8 PRODUCT DELIVERY STORAGE AND HANDLING

A. Delivery: Deliver materials in the manufacturer's original sealed and labeled containers and in quantities required to allow continuity of application.

B. Storage: Store materials out of direct exposure to the elements. Store roll goods on a clean, flat and dry surface. All material stored on the roof overnight shall be stored on pallets. Rolls of roofing must be stored on ends. The roof shall not be loaded with roofing material except for material to be used that day. Load materials on the roof in a manner so as to preclude overloading of deck and building structure. Store materials such as solvents, adhesives and asphalt cutback products away from open flames, sparks or excessive heat. Cover all material using a breathable cover such as a canvas. Polyethylene or other non-breathable plastic coverings are not acceptable.

C. Handling: Handle all materials in such a manner as to preclude damage and contamination with moisture or foreign matter. Handle rolled goods to prevent damage to edges or ends.

D. **Damaged Material: Any materials that are found to be damaged or stored in any manner other than stated above will be automatically rejected, removed and replaced at the Contractor's expense**.

1.9 PROJECT/SITE CONDITIONS

A. Requirements Prior to Job Start

1. Preliminary Roofing Conference: As soon as possible after award of modified bitumen roofing work, meet with Installer (Roofer), installers of substrate construction (decks) and other work adjoining roof system including penetrating work and rooftop units, Architect, Owner, and representatives of other entities directly concerned with performance of roofing system including (as applicable) Owner's insurers and test agencies. Provide a minimum of 72 hours advanced notice to participants prior to convening pre-roofing conference.
2. Review requirements for tear-off of existing membrane roofing and phasing requirements of project.
3. Review requirements of Contract Documents, submittals, status of coordinating work, availability of materials, and installation facilities and establish preliminary installation schedule. Review requirements for inspections, testing, certifications, forecasted weather conditions, governing regulations, insurance requirements, and proposed installation procedures.

4. Discuss roofing system protection requirements for construction period extending beyond roofing installation.
5. Record discussion, including agreement or disagreement on matters of significance; furnish copy of recorded discussions to each participant within 7 days following the meeting. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

B. Preapplication Roofing Conference: Approximately two weeks prior to scheduled commencement of modified bitumen roofing installation and associated work, meet at project site with Installer, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing that must precede or follow roofing work (including mechanical work if any), Architect, Owner, Roofing System Manufacturer's Quality Control Representative (not salesperson), and other representatives directly concerned with performance of the work, including (where applicable) Owner's insurers, test agencies, and governing authorities.

1. Review foreseeable methods and procedures related to roofing work, including but not necessarily limited to the following:
   a. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations, and other preparatory work performed by other trades.
   b. Review structural loading limitations of steel deck and inspect deck for loss of flatness and for required mechanical fastening.
   c. Review roofing system requirements (drawings, specifications, and other contract documents).
   d. Review required submittals, both completed and yet to be completed.
   e. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   f. Review required inspection, testing, certifying, and material usage accounting procedures.
   g. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including temporary roofing.
2. Contractor shall record discussions of conference, including decisions and agreements (or disagreements) reached, and furnish copy of record to each party attending within 7 days following the meeting. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
3. Notification: Give a minimum of five (5) days notice to the Owner and manufacturer prior to commencing any work and notify both parties on a daily basis of any change in work schedule.
4. Permits: Obtain all permits required by local agencies and pay all fees which may be required for the performance of the work.
5. Safety: Familiarize every member of the application crew with all fire and safety regulations recommended by OSHA, NRCA and other industry or local governmental groups.

C. Environmental Requirements

1. Precipitation: Do not apply roofing materials during precipitation or in the event there is a probability of precipitation during application. Take adequate precautions to ensure that materials, applied roofing, and building interiors are protected from possible moisture damage or contamination.

D. Protection Requirements

1. Membrane Protection: Provide protection against staining and mechanical damage for newly applied roofing and adjacent surfaces throughout this project.
2. Limited Access: Prevent access by the public to materials, tools and equipment during the course of the project.
3. Debris Removal: Remove all debris daily from the project site and take to a legal dumping area authorized to receive such materials.
4. Site Condition: Complete, to the owner's satisfaction, all job site clean-up including building interior, exterior and landscaping where affected by the construction.

1.10 GUARANTEE/WARRANTY

A. Manufacturer's Guarantee: Guarantee all roofing materials including modified bitumen membrane, liquid-applied roofing system, modified system flashings, flashings, gravel stops and fascia, insulation, fabricated or prefabricated items used in the roof installation by the installer, and associated materials. The guarantee shall be term type, without deductibles or limitations on coverage amount. No Dollar Limit (NDL) for the following period of time:

1. Twenty years from date of Substantial Completion.
2. Guarantee all materials and labor for damages inclusive of a U.L. Class 90 wind resistance rating with sustained winds to 74 mph. Project shall be considered within ten miles of coastline.
3. In the event the roof fails to perform, the roofing manufacturer shall, without additional cost to the Owner, make repairs or modifications to the roof necessary to enable the roof to perform as guaranteed. The written guarantee shall state a reasonable time limit for roofing manufacturer to inspect the problems and execute repairs following receipt of written notice from the Owner.
4. No exclusion for ponding water is allowed in the low sloped area designated on the plans. Full 20 Year NDL Coverage must be extended to these areas.

B. In addition to Manufacturer's and Contractor's guarantees, Roofing Installer shall guarantee materials and workmanship of the finished installation to the full extent as that of the manufacturer's guarantee as outlined in this “Guarantee/Warranty” article.

1. Installer warranty shall be two (2) years from date of Final Acceptance.
   a. Warranty shall be signed by the installer and the General Contractor.

PART 2 - PRODUCTS

2.1 ROOFING SYSTEM ASSEMBLY

A. Roofing Membrane Assembly: A roof membrane assembly consisting of two (2) plies of a prefabricated, fiberglass reinforced, homogeneous Styrene-Butadiene-Styrene (SBS) copolymer modified asphalt membrane secured to a prepared substrate. The modified bitumen base ply shall be fully adhered to the prepared substrate as specified herein, and shall possess waterproofing capability such that a phased roof application with only the modified bitumen base ply in place can be achieved for prolonged periods of time without detriment to the watertight integrity of the entire roof system, but shall not exceed the manufacturer’s recommendations or a maximum of ninety (90) days extra. Provide roof system components meeting the following physical and mechanical requirements.

B. **Styrene-Butadiene-Styrene (SBS)** Modified Bitumen Roof System:

1. Modified Bitumen Base Ply: ASTM D 6163, Grade S, Type II, SBS-modified asphalt sheet (reinforced with glass fibers); smooth surfaced; suitable for application method specified.
   a. Siplast Paradiene 20 HT
   b. Soprema Elastophene HR
   c. Johns Manville DynaBase XT
2. Modified Bitumen Cap Sheet: ASTM D 6163, Grade G, Type I, SBS-modified asphalt sheet (reinforced with glass fibers); white ceramic-coated granular surfaced; suitable for application method specified.
   a. Siplast Paradiene 30 FR.
   b. Soprema Elastophene FR GR
   c. Johns Manville Dyna Glass FR
3. Stripping Ply: (Same as roof system base ply unless noted).
4. Flashing Membrane Assembly: ASTM D 6298, aluminum-foil surfaced SBS-modified asphalt sheet (reinforced with glass fibers); suitable for application method specified. **Flashings are to be installed in cold adhesive. No torching of base flashings is allowed.**
   a. Siplast Veral Aluminum
   b. Soprema Sopralast 50 TV Aluminum
   c. Johns Manville Dyna Clad Aluminum
5. Reinforcing Ply: Same as roof system base ply.

2.2 AUXILIARY ROOFING MEMBRANE MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.

B. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, one- or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with roofing membrane and base flashings.
   1. Adhesive for Roof Membrane: A cold-applied solvent based asphaltic adhesive meeting ASTM 4479 Type II. Typical coverage rate ranges from 1.5-2.5 gallons per square.
      a. Siplast PA-311 adhesive.
      b. Soprema Adhesive VOC
      c. Johns Manville MBR Cold-Application Adhesive
   2. Adhesive for Aluminum Faced Base Flashing Membrane: A single component cold-applied solvent free flashing adhesive. Typical coverage rate ranges from 2.0-2.5 gallons per square.
      a. Siplast SFT flashing adhesive.
      b. Soprema High Velocity Flashing Adhesive
      c. Johns Manville MBR Utility Cement

C. Roofing Cement: Provide ASTM D 4586 asphalt roofing cement or roofing system manufacturer’s modified asphalt roofing cement, asbestos free, of consistency required by roofing system manufacturer for application.

D. Metallic Powder: A finely graded metal dust as supplied or approved by the membrane manufacturer, used for covering of bitumen overruns over the foil surfaced membrane.

E. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.

F. Metal Flashing Sheet: Refer to Division 07 Section “Sheet Metal, Flashing and Trim.”

G. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing membrane.

H. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

I. Liquid Resin Flashing System: Provide polyester-reinforced catalyzed resin flashing system matching similar fluid-applied membrane roofing system for all electrical, mechanical, plumbing, and structural penetrations through roof unless detailed otherwise. Traditional sheet metal formed pitch pockets utilizing asphalts, flashing cements, and utility cements shall not be acceptable. All liquid resin system flashed penetrations must be covered under the manufacturer’s 20 year NDL Guarantee.

1. Manufacturer may submit for approval alternate warranted flashing methods at no additional cost to the Owner. Failure of an alternate to be accepted shall be the responsibility of the manufacturer. Architectural Sheet Metal Manual roof penetration flashing details are acceptable alternates to specified polyester-reinforced catalyzed resin flashing system as applicable, subject to being covered by roofing manufacturer’s guarantee.

2.3 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

1. Refer to Division 6 Section “Rough Carpentry” for composite nail base insulated sheathing for roof-side or parapet applications indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.

1. (Related composite nail base insulated sheathing for parapet applications is specified in Division 6 Section “Rough Carpentry.”)

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/16 and 1/4 inch per 12 inches unless otherwise indicated see roof slope schedule on title sheet.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.4 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing membrane components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.

1. Metal Decks: Provide insulation mechanical fasteners and metal plates for metal decks that have been factory coated for corrosion resistance, and when subjected to 30

Kesternich cycles, must show less than 10 percent red rust, conforming to Factory Mutual 4470. Acceptable insulation fastener types for metal decks are listed below:

a. Dekfast #12 + Dekfast Steel Hexagonal Plates, by Construction Fasteners, Inc.
b. #12 Standard Roofing Fastener by Olympic Fasteners.

C. Insulation Adhesive: Provide the following.

1. Bead-Applied Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, one-component or multi-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

D. Insulation Cant Strips: ASTM C 728, perlite or ASTM C 208, Type II, Grade 1, cellulosic-fiber.

E. Cover Board:

1. ASTM C1278 compliant, moisture-resistant, gypsum-cellulose board with maximum 10% water absorption by weight per ASTM C473; mold-resistant per ASTM D3273, 1/2-inch thick. USG Corporation; “Securock.”

F. Substrate Joint Tape: 6- or 8-inch- wide, coated, glass-fiber joint tape.

2.5 WALKWAYS

A. Walkway Cap Sheet Strips: ASTM D 6164, Grade G, Type I or II, SBS-modified asphalt sheet (polyester fabric reinforced) or ASTM D 6163, Grade G, Type I or II, SBS-modified asphalt sheet (glass fiber reinforced); granular surfaced; suitable for application method specified. Siplast “Paratread Roof Protection Material” basis of design.

1. Granule Color: Contrast color to capsheet, selected from manufacturer’s standards.
2. Thickness: 5.5 mm - (0.217 in).
3. Weight: 8.8 Kg/m^2 - (1.8 lbs/ft^2).
4. Width: 76.2 cm (30 in).

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide complete tear-off of existing membrane roofing in accordance with Division 7 Section “Preparation for Re-Roofing” and with project phasing requirements.

B. General: Sweep or vacuum all surfaces, removing all loose aggregate and foreign substances prior to commencement of roofing. Coordinate disconnection removal reinstallation and reconnection of all roof top plumbing, mechanical, and electrical items that may have been connected or installed prior to roofing that requires roofing to be properly installed or flashed.

3.2 SUBSTRATE PREPARATION AND INSULATION INSTALLATION

A. Insulation: Comply with insulation manufacturer's instructions and recommendations for the handling, installation, and bonding or anchorage of insulation to substrate. Examine substrate before starting work. Surfaces to receive insulation shall be clean, smooth, and dry. Verify that wood blocking has been installed at edges, walls, and other openings. Install insulation panels with end joints offset; edges of the panels shall be in moderate contact without forcing applied in strict accordance with the insulation manufacturer's requirements and the following instructions.

1. Acoustical Steel Deck Sound-Absorbing Insulation: Install manufacturer's standard premolded roll or strip of mineral fiber into topside of deck prior to installation of base layer and tapered layers of roofing insulation.

B. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing membrane system with vertical surfaces or angle changes more than 45 degrees.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

E. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 12 inches in each direction.

1. Coordinate with “ROOF SLOPE TAPERED INSULATION SCHEDULE” on title sheet.

F. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten first layer of insulation over entire area of roofing at spacing as required by FM for Windstorm Resistance Classification I-90. Run long joints for insulation in continuous straight lines, perpendicular to roof slope with end joints staggered between rows.

2. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place. Provide adhesive bead spacing as required for uplift requirements at roof field, perimeter and corner applications. Stagger joints of second layer a minimum of 12 inches each direction from joints of first layer. Weigh down boards at corners and at the center until adhesive has set-up.

G. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows, set in adhesive for full bond. Offset joints a minimum of 6 inches in each direction from joints of insulation below. Loosely butt cover boards together. Tape joints if required by roofing system manufacturer.

1. Cricket Areas: Construct crickets of tapered polyisocyanurate panels between the roof drains. Install each cricket directly over the surface of the top layer of insulation to facilitate prompt and complete removal of water to each roof drain.

2. Trim surface of insulation where necessary at roof drains so completed surface is flush with ring of drain.

3.3 ROOF MEMBRANE INSTALLATION

A. Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations in ARMA/NRCA's “Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing.”

1. Install roofing system **MBS-2-I-L-M**, according to roof assembly identification matrix and roof assembly layout illustrations in “The NRCA Roofing and Waterproofing Manual” and to requirements in this Section.

B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Cooperate with testing agencies engaged or required to perform services for installing roofing system.

D. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. At end of each day's work, provide tie-offs to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement, with joints and edges sealed.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

E. Substrate-Joint Penetrations: Prevent adhesives from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

F. Aesthetic Considerations: The overall appearance of the finished roof application is a standard requirement for this project. The Contractor shall make necessary preparations, utilize recommended application techniques, apply the specified materials (i.e. granules, metallic powder, etc.), and exercise care in ensuring that the finished application is acceptable to the Owner.

G. The Manufacturer’s Quality Control Representative shall visit the site every other week, and at conclusion of the project. Representative shall provide 24 hour notice to the Owner of all visits made to the site and shall submit to the Architect/Engineer, within 3 days following site visits, written reports of findings from their field visits. Failure to provide visits and reports shall be cause for withholding pay application for roofing materials and labor and shall be cause of removal of roofing contractor from project without further notice.

H. Priming: Prime metal flanges (all jacks, edge metal, lead drain flashings, etc.) and concrete and masonry surfaces with a uniform coating of asphalt primer ASTM D 41.

I. Adhesive Consistency: Cutting or alterations of adhesives, primer, and sealants will not be permitted.

J. Roofing Application: Apply all layers of roofing free of wrinkles, creases or fishmouths. Exert sufficient pressure on the roll during application to ensure prevention of air pockets. Lap seams in the base ply layer should not coincide with the lap seams of the finish ply layer. Heat-weld lap seams in accordance with membrane manufacturer’s recommendations. The courses should be staggered to ensure this.

1. Apply all layers of roofing perpendicular to the slope of the deck.
2. Fully bond the base ply to the prepared substrate, having a minimum of three (3) inch side and end laps. Each sheet shall be applied directly in cold-applied adhesive.
3. Fully bond the finish ply to the base ply, having a minimum of three (3) inch side and end laps. Each sheet shall be applied directly in cold-applied adhesive.
4. Maximum sheet lengths and special fastening of the specified roof membrane system may be required at various slope increments where the roof deck slope exceeds one-half (1/2) inch per foot. The manufacturer shall provide acceptable sheet lengths and the required fastening schedule for all roofing sheet applications to applicable roof slopes.

K. Flashing Application: Use only cold applied adhesive. Flash masonry, wood and plywood parapet walls and curbs using the modified bitumen reinforcing sheet and the metal foil flashing membrane. The reinforcing sheet shall have minimum three (3) inch laps, extending a minimum of three (3) inches onto the base ply surface and on vertical wood or masonry substrate as indicated. After the finish ply has been applied to the top of the cant, prepare the surface area that is to receive flashing coverage by application of asphalt primer to foil surfaces; allowing primer to dry thoroughly. Adhesive apply the metal foil flashing into place using three foot lengths (cut from the end of roll) and using the factory selvage edge for laps, extending a minimum of four (4) inches beyond the toe of the cant onto the prepared surface of the finished roof. Exert pressure on the flashing sheet during application to ensure complete contact with the wall/roof surfaces, preventing air pockets; this can be accomplished by using a damp sponge or shop rag. Check and seal all loose laps and edges. Nail the top edge of the flashing on nine (9) inch centers. (See manufacturer's schematic for visual interpretation).

1. At masonry wall and parapet surfaces, extend flashing a minimum of three (3) inches onto the base ply surface and three (3) inches up the parapet wall above the cant. Adhere the reinforcing sheet by adhesive; ensuring full adhesion. Never coincide the laps of the metal foil flashing layer with the lap seams in the reinforcing layer.
2. A wood or plywood parapet walls and curbs, extend flashing a minimum of three inches onto the base ply surface and to the top of the parapet wall, curb, etc. Nail the reinforcing sheet on twelve (12) inch centers in all directions to the vertical wood surface from the top of the cant to top of wall, curb, etc. Adhere the remainder of sheet that extends over the cant and roof level.

L. Use of Metallic Powder: Broadcast metallic powder over all bitumen overruns on the metal foil membrane surface while the bitumen is still hot to ensure a monolithic surface color.

M. Water Cut-Off: At end of day's work, or when precipitation is imminent, construct water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to the resumption of roofing.

3.4 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS

A. The following is a list of verbal descriptions for correct installation of components integrated into the roof membrane assembly. In all cases, unless otherwise approved, incorporate flanged components into the system between the application of the base ply and the finish ply. The flange must be primed with a uniform coating of approved ASTM D 41 asphalt primer and allowed to dry thoroughly; all flanges must be set in approved mastic.

1. Edge Metal: Completely prime metal flanges and allow to dry prior to installation. Turn the base ply down two (2) inches past the roof edge and over the nailer. After the base ply and continuous cleat (if applicable) have been installed, set the flange in mastic and stagger nail every three (3) inches on center. Strip-in the flange using the base ply material, extending a minimum of four (4) inches beyond the edge of the flange. The finish ply shall then be applied, terminating at the gravel-stop rise of the edge metal. SEE ITEM: SEALANT, for finish of this detail.
2. Lead Pipe Flashings: Completely prime the lead flanges and allow to dry prior to installation. After the base ply has been applied, set the flange in mastic and strip-in the flange using the base ply material, extending a minimum of four (4) inches beyond the edge of the flange. The finish ply shall then be applied, terminating at the flange-sleeve juncture of the pipe flashing. SEE ITEM: SEALANT for finish of this detail.

3. Lead Drain Flashings: Completely prime the lead drain flashing and allow to dry prior to installation. After the base ply has been applied, set the lead flashing sheet in mastic and form to turn down inside of the drain bowl. Ply-in the perimeter of the lead flashing using an additional layer of the base ply material, overlapping the perimeter of the lead a minimum of four (4) inches. The finish ply shall then be applied, extending beyond the clamping ring seal. Install the clamping ring with all clamps, bolts, etc., in place.
4. Metal Pipe Flashings: Flash with liquid-applied flashing resin or approved alternate flashing system.
    a. Completely prime the metal pipe flanges and allow to dry prior to installation. After the base ply has been applied, set the flanges in mastic and strip-in the flange using the base ply material, extending a minimum of four (4) inches beyond the edge of the flange. The finish ply shall then be applied, terminating at the flange-sleeve juncture of the pipe flashing. Install a watertight umbrella to the penetration, completely covering the opening of the pipe flashing. SEE ITEM: SEALANT for finish of this detail.
5. Walktread: Cut the walktread into maximum five (5) foot lengths and allow to relax until flat. Adhere the sheet using the specified plastic cement. The cement is applied to the back of the product in spots of five (5) inches by five (5) inches in accordance with the pattern as supplied by the walktread manufacturer. Apply the cement using a three eighths (3/8) inch thickness. Walk-in each sheet after application to ensure proper adhesion. Use a minimum spacing of two (2) inches between sheets to allow for proper drainage.
6. Sealant: Caulk all exposed finish ply edges at gravel stops, waste stacks, pitch pans, vent stacks, etc., with a smooth continuous bead of approved sealant.
7. Roof Penetrations (Small Diameter): Design and install all conduit, electrical, and compressor line penetrations using manufacturer's standard “Dog House” construction.

3.5 FIELD QUALITY CONTROL AND INSPECTIONS

A. Site Condition: All areas around job site shall be free of debris, roofing materials, equipment and related items after completion of job.

B. Notification of Completion: Contractor shall notify manufacturer by means of manufacturer's printed Notification of Completion form of job completion in order to schedule a final inspection date.

C. Final Inspection
1. Post-Installation Meeting: Hold a meeting at the completion of the project, attended by all parties that were present at the pre-job conference. A punch list of items required for completion shall be compiled by the Contractor and the manufacturer's representative. Complete, sign, and mail the punch list form to the manufacturer's headquarters.
2. Drain Verification: At final inspection of all work, verify that all drains, scuppers, etc., are functioning properly. Drains shall have adequate strainers.

D. The Roofer shall conduct an infrared scan of the entire roof replaced and submit a report of the findings. The scan shall be conducted by a certified inspection company. The report shall also be accompanied by a CD containing all images taken during the survey.

E. Issuance of the Guarantee: Complete all post installation procedures and meet the manufacturer's final endorsement for issuance of the specified guarantee.

F. Within thirty (30) days of Substantial Completion roofing contractor shall perform an infrared survey to ascertain the presence of moisture in the roof system and submit copies to Contractor, Owner and Architect. Any finding of moisture shall be remedied and necessary repairs made in compliance with manufacturer's warranty requirements.

G. Two-Year Inspection: Contact the manufacturer during the ninety (90) day period immediately preceding the two (2) year anniversary of the guarantee date to arrange for a mandatory two-year inspection. The inspection shall be attended by the Owner, Architect-Engineer, and Contractor and the manufacturer's representative. A two-year inspection punchlist shall be compiled by the manufacturer and submitted to the Contractor for his completion. Upon completion, sign and mail the punchlist form to the manufacturer's headquarters, verifying that all items are in accordance with the manufacturer's recommendations.

END OF SECTION 075200

ARMSTRONG ELEMENTARY SCHOOL ROOF REPLACEMENT AND MASONRY RESTORATION

TWO YEAR ROOFER'S WARRANTY

WHEREAS
OF (Address)
herein called the "Roofing Contractor", has performed roofing and associated work ("work") on following project:

Owner:
Address:
Name and Type of Building:
Address:
Area of Work:_____ Date of Acceptance:

Warranty Period: 2 Years Date of Expiration:

AND WHEREAS Roofing Contractor has contracted with the Owner to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period.

NOW THEREFORE Roofing Contractor hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in watertight condition, and comply with roofing manufacturer's requirements for the NDL warrantee specified.

This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to the building contents, caused by: a) lightning, windstorm; b) fire; c) failure of roofing system substrate including cracking, settlement, excessive deflection, deterioration, and decomposition; d) faulty construction of parapet walls, copings chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work; e) vapor condensation on bottom of roofing; and f) activity on roofing by others including maintenance personnel and other persons and animals whether authorized or unauthorized by Owner. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Contractor, and until cost and expense thereof has been paid by Owner or by another responsible party so designated.

2. The Roofing Contractor is responsible for damage to work covered by this Warranty, but is not liable for consequential damages to building or building contents, resulting from leaks or faults or defects of work during the term of this Warranty.

3. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Contractor, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void at that area upon date of said alterations, but only to extend said alterations affect work covered by this Warranty. If Owner engages Roofing Contractor to perform said alterations, warranty shall not become null and void, unless Roofing Contractor, prior to proceeding with said work, shall have notified Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this warranty.

4. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void upon date of said change, but only to extent said change affects work covered by this Warranty.

5. The Owner shall promptly notify Roofing Contractor of observed, known or suspected leaks, defect, or deterioration, and shall afford reasonable opportunity for Roofing Contractor to inspect work, and to examine evidence of such leaks, defects, or deterioration.

6. This Warranty shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to him in cases of roofing failure. Specifically, this Warranty shall not operate to relieve the Roofing Contractor of responsibility for performance of original work in accordance with requirements of the Contract Documents.

IN WITNESS THEREOF, this instrument has been duly executed on this _____ day of
_____, 20___.

By:_____ of

Signature

Notarized by _____ Seal here
Name

Signature _____

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work of this Section.

1.2 SCOPE

A. This Section includes the following:

1. Metal counter flashing and base flashing.
2. Metal wall flashing and expansion joints.
3. Exposed metal trim/extruded gravel stop (fascia) units.
4. Lead formed roof drain sumps.
5. Miscellaneous sheet metal accessories.
6. Elastic flashing.
7. Elastic roof/wall expansion joint systems.
8. Metal copings.
9. Roof drainage sheet metal fabrications.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Integral masonry flashings such as metal counterflashing, etc. are specified as masonry work in sections of Division 4.

3. Wood nailers, curbs and blocking in Division 6 Section “Rough Carpentry.”

4. Roofing accessories installed integral with roofing membrane are specified in Division 7 Section “Modified Bitumen Membrane Roofing” as roofing work.

6. Division 7 Section “Joint Sealers” for field-applied sheet metal flashing and trim sealants.

8. All materials specified in this section installed in conjunction with the roofing shall form part of the Total System Warranty required by Division 7 Section “Modified Bitumen Membrane Roofing”.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, railing, leaking and fastener disengagement.

B. Manufacture and install copings and roof edge flashings tested according to ANSI/SPRI ES-1 and capable of resisting the design pressures indicated on Drawings. **Provide manufactured pre-engineered roof edge systems; break-metal assemblies fabricated in accordance with NRCA are not acceptable in lieu of manufactured pre-engineered roof edge systems specified.**

1. Roof Edge Fascia System: Conform to ANSI/SPRI ES-1 Test Method RE-1 for roof edge termination to secure the membrane to a minimum of 100 psf. Conform to ANSI/SPRI ES-1 Test Method RE-2 pull-off test for fascia to meet design pressure requirement.

2. Coping System: Conform to ANSI/SPRI ES-1 Test Method RE-3 pull-off test for coping to meet design pressure requirement.

C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Submit confirmation that roof edge systems conform to ANSI/SPRI ES-1 performance requirements.

B. Product data, Flashing, Sheet Metal, and Accessories: Manufacturer's technical product data, installation instructions and general recommendations for each specified sheet material and fabricated product.

C. Samples of the following flashing, sheet metal, and accessory items:

1. 12-inch-long samples of factory-fabricated products exposed as finished work. Provide complete with specified factory finish.

D. Shop drawings showing layout, profiles, methods of joining, and anchorages details, including major counterflashings, trim/gravel stop units, and expansion joint systems. Provide layouts at 1/4-inch scale and details at 3-inch scale.

E. Samples for initial selection purposes in form of manufacturer's sample finishes showing full range of colors and textures available for those units with factory-applied color finishes.

F. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 inches long. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim: 12 inches long. Include fasteners and other exposed accessories.
3. Accessories: Full-size Sample.

G. Qualification data for firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of complete projects with project names and addresses, names and addresses of architects and owners and other information specified.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed sheet metal flashing and trim work similar in material design, and extent to that indicated for this project and with a record of successful in-service performance.

B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
   1. Copper Standard: Comply with CDA's "Copper in Architecture Handbook."

C. Mockups: Prior to installing sheet metal flashing and trim, build mockups to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup of typical built-in gutter, approximately 96 inches long, including supporting construction cleats, seams, attachments and accessories. Provide gutter drain outlet and downspout with downspout straps for review. Provide gutter closures on one end. Install gutter mockup over mockup specified in Section 074243 “Aluminum Composite Panel”.
   2. Approval of mockups is for other material and construction qualities specifically approved by Architect in writing.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
   4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
   5. In the event that mock-up fails to meet criteria, Contractor will re-build and correct the sample at no cost to the Owner until acceptable mock-up is attained.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

1.8 PROJECT CONDITIONS

A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 SHEET METAL FLASHING AND TRIM MATERIALS MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

C. Sheet Aluminum: ASTM B 209, alloy 3003, temper H14, factory painted. 0.032-inch thick (20 gage) minimum except as otherwise indicated.

D. Extruded Aluminum: Shall be extrusions of sizes profiles indicated, 6063-T52, 0.080 inch thick minimum for primary legs of extrusions.

E. Miscellaneous Materials and Accessories:

1. Solder: For use with copper, provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.
2. Fasteners: Same metal as flashing/sheet metal or other non-corrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
3. Bituminous Coating: SSPC - Paint 12, solvent-type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
4. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non- drying, nonmigrating sealant.
5. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealers."
6. Epoxy Seam Sealer: 2-part noncorrosive metal seam cementing compound, recommended by metal manufacturer for exterior/interior nonmoving joints including riveted joints.
7. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/weather-resistant seaming and adhesive application of flashing sheet.
8. Paper Slip Sheet: 5-lb. rosin-sized building paper.
9. Polyethylene Underlayment: Minimum 6-mil carbonated polyethylene film resistant to decay when tested in accordance with ASTM E 154.
10. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.
11. Roofing Cement: ASTM D 2822, asphaltic. Non-asbestos.

F. Lead Flashing: Minimum 30 inch square 4 pounds per square foot for roof drain sumps. 2-1/2 pounds for vent stacks. Flash stacks for full height and turn down flashing material over top edge of stack a min of 1- inch.

2.2 FABRICATED UNITS

A. General Metal Fabrication: Shop fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

B. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.

C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

D. Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.

E. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

F. Aluminum Extrusion Units: Fabricate extruded aluminum running units with formed or extruded aluminum joint covers for installation behind main members where possible. Fabricate mitered and welded corner units.

2.3 SHEET ALUMINUM FASCIA SYSTEMS AND COPINGS:

A. One-Piece Gravel Stops: Manufactured, one-piece, metal gravel stop in section lengths not exceeding 12 feet, with a horizontal flange and vertical leg, fascia terminating in a drip edge, and concealed splice plates of same material, finish, and shape as gravel stop. Provide matching corner units.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. Berger Building Products, Inc.
    b. Hickman Company, W. P.
    c. Metal-Era, Inc.
    d. Imetco Corporation.
    e. Perimeter Systems; a division of Southern Aluminum Finishing Company, Inc.
2. Fabricate from the following exposed metal:
    a. Formed Aluminum: 0.040 inch thick.

B. Fascia for Asphalt or Modified Bitumen Roofing: Manufactured pre-engineered system consisting of minimum formed 0.040 inch aluminum fascia, extruded or formed aluminum compression clamp and minimum 24 gauge, formed, zinc-coated steel water dam; of profile and fascia height indicated; with water dam and clamp of proper configuration and size for type of roofing system indicated; with concealed splice plates. Provide prefabricated outside and inside corner, miters welded before finishing. Provide roof edge system tested in accordance with ANSI/SPRI ES-1 Test Method RE-1 for roof edge termination to secure the membrane to a minimum of 100 psf and tested in accordance with ANSI/SPRI ES-1 Test Method RE-2 pull-off test for fascia to meet design pressure requirement.

1. Nominal fascia height varies see drawings.
2. Design standard: Anchor –Tite, by Metal-Era.

C. Interlocking Multi-Part Coping System: Manufactured pre-engineered coping system (roofer-fabricated copings not acceptable) consisting of formed 0.050 inch aluminum coping of profile indicated, minimum 20 gauge zinc-coated steel anchor plates, and concealed splice plates. Provide prefabricated inside and outside corners, miters welded before finishing; without exposed fasteners. Provide roof edge system tested in accordance with ANSI/SPRI ES-1 Test Method RE-3 pull-off test for coping to meet design pressure requirement. Design standard is Metal-Era Perma-Tite Coping-Series II.

1. Provide custom perforated metal vent component of coping system indicated. Coordinate continuous perforated vent with coping anchors at manufacturer's recommended spacing to maintain ventilation path.
2. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:
   a. "Permasnap Coping"; W. P. Hickman Co.
   b. "Perma-Tite II "; Metal-Era
   c. "ES-C Sloped Coping," Imetco

D. Provide manufactured formed fascia & manufactured coping assemblies from same manufacturer with same finish.

E. Fluoropolymer Coating: Provide a high performance fluorocarbon coating conforming AAMA 2605 consisting of a minimum 70% fluoropolymer resin coating in a DFT of 0.9 mil minimum, 30% reflective gloss (ASTM D 523), over 0.15 mil minimum baked-on epoxy primer.

1. Durability: Provide coating which has been field tested under normal range of weathering conditions for minimum of 20 years without significant peel, blister, flake, chip, crack or check in finish; and without chalking in excess of 8 (ASTM D 659), and fading in excess of 5 NBS units for vertical surfaces. (Values are reduced for exposures at an angle from the vertical position.)
2. Provide colors selected by Architect from manufacturer's standards or published standard 2-coat, non-metallic colors of PPG "Duranar" or Valspar "Fluropon." One color is required for project.
3. Provide "Kynar ADS" (air cured fluoropolymer resin coating) coating material to match "Kynar 500" coating for field touch-up use.

2.4 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch-long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.

1. Gutters: Fabricate from the following material:
   a. Aluminum: 0.050 inch thick.

2.5 ALUMINUM FINISHES (TYPICAL FOR ALL EXPOSED ALUMINUM ITEMS)

A. General: Comply with AMP 501 "Finishes for Aluminum" and AMP 505 "Applied Coatings" for finish designations and application recommendations, except as otherwise indicated. For components, which are assembled or welded in factory, apply finish after fabrication is completed.

1. Provide custom colors to be selected by Architect.
2. High Performance Coating: AA-C12C42R1x (cleaned with inhibitive chemicals,

conversion coated with an acid-chromate-fluoride-phosphate treatment and painted with organic coating specified below). Apply in strict compliance with coating and resin manufacturer's instructions using a licensed applicator.

a. Fluorocarbon Coating: Inhibitive thermo-cured primer, minimum 0.2 mil dry film thickness, and thermo-cured fluorocarbon coating containing "Kynar 500" resin, minimum 1.0-mil dry film thickness.

B. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

C. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of **10 feet** with no joints within 24 inches of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not solder metallic-coated steel and aluminum sheet.
2. Do not use torches for soldering.
3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
4. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

5. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.

3.4 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with epoxy seam sealant (rivet joints for additional strength). Provide for thermal expansion. Attach gutters at eave or fascia spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.

1. Fasten gutter spacers to front and back of gutter.
2. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion joint caps.
3. Install continuous gutter screens on gutters with noncorrosive fasteners, hinged to swing open for cleaning gutters.

C. Downspouts: 3-inch Polyvinyl Chloride, schedule 40 pipe, painted to match the color selected for the gutter.

1. Provide elbows at base of downspout to direct water away from building.
2. Provide concrete splash blocks or slabs where shown.
3. Connect downspouts to underground drainage system when indicated.

D. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated.

E. Lap joints a minimum of 4 inches in direction of water flow.

3.5 ROOF EXPANSION JOINT INSTALLATION

A. General: Comply with manufacturer's written instructions for handling and installing.

1. Anchor roof expansion joints securely in place, with provisions for required movement. Use fasteners, protective coatings, sealants, and miscellaneous items as required to complete roof expansion joints.
2. Install roof expansion joints true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
3. Provide for linear thermal expansion of roof expansion joint materials.
4. Provide uniform profile of roof expansion joint throughout its length; do not stretch or squeeze membranes.
5. Provide uniform, neat seams.
6. Install roof expansion joints to fit substrates and to result in watertight performance.
7. Torch cutting of roof expansion joints is not permitted.
8. Do not use graphite pencils to mark aluminum surfaces.

B. Directional Changes and Other Expansion-Control Joint Systems: Coordinate installation of roof expansion joints with other expansion-control joint systems to result in watertight performance. Install shop fabricated units at directional changes and at transitions between roof expansion joints and exterior expansion-control joint systems to provide continuous, uninterrupted, and welded watertight joints.

C. Splices: Splice roof expansion joints with materials provided by roof-expansion-joint manufacturer for this purpose, to provide continuous, uninterrupted, and waterproof joints.

1. Install waterproof splices and prefabricated end dams to prevent leakage of secondary-seal membrane.

D. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

3.6 ROOF FLASHING INSTALLATION

A. Copings: Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners. Anchor copings to meet performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates. Anchor to substrate at manufacturer's required spacing to meet performance requirements.
2. Provide custom perforated metal vent component as indicated.

B. Roof Edge Flashing (Fascia/Gravelstop): Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant, or interlocking folded seam or blind rivets and sealant unless otherwise indicated.

E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with butyl sealant and clamp flashing to pipes that penetrate roof.

3.7 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated.

B. Through-Wall Flashing: Installation of through-wall flashing as shown on drawings

3.8 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.9 CLEANING AND PROTECTION

A. Clean exposed metal surfaces, removing substances that might cause corrosion of metal or deterioration of finishes.

B. Protection: Provide required protection of flashings and sheet metal work during construction to ensure that work will be without damage or deterioration other than natural weathering at time of

Substantial Completion and Final Acceptance.

END OF SECTION 076200

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Roof curbs.
2. Relief Vent hoods
3. Exhaust fans
4. Flue flashing
5. Roof Drains and piping

B. Related Sections include the following:

1. Division 05 Section "Metal Fabrications" for metal vertical ladders and stairs.
2. Division 06 Section "Rough Carpentry" for roof sheathing, wood cants, and wood nailers
3. Division 07 low-slope roofing Sections for roofing accessories.
4. Division 07 Section "Sheet Metal Flashing and Trim" for shop- and field-fabricated metal flashing and counterflashing, roof expansion-joint covers, and miscellaneous sheet metal trim and accessories.

1.3 SUBMITTALS

A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed factory-applied color finish required and for each type of roof accessory indicated, prepared on Samples of size to adequately show color.

D. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify required openings for each type of roof accessory by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 COORDINATION

A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

1. With Architect's approval, adjust location of roof accessories that would interrupt roof drainage routes.

1.8 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof accessories that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers listed in other Part 2 articles.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers listed in other Part 2 articles.

2.2 METAL MATERIALS

A. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coated.

B. Aluminum Extrusions and Tubes: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use, mill finished.

C. Stainless-Steel Shapes or Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304 or Type 316, No. 2D finish.

D. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized to comply with ASTM A 123/A 123M, unless otherwise indicated.

E. Galvanized Steel Tube: ASTM A 500, round tube, hot-dip galvanized to comply with ASTM A 123/A 123M.

F. Galvanized Steel Pipe: ASTM A 53/A 53M.

2.3 MISCELLANEOUS MATERIALS

A. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by roof accessory manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners.

B. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge neoprene, or cork.

C. Elastomeric Sealant: ASTM C 920, polyurethane sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.4 ROOF CURBS

A. Roof Curbs: Provide metal roof curbs, internally reinforced and capable of supporting superimposed live and dead loads, including equipment loads and other construction to be supported on roof curbs. Fabricate with welded or sealed mechanical corner joints, with integral formed mounting flange at perimeter bottom. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1. Available Manufacturers:

    a. Colony Custom Curbs.
    b. Commodity Products Company, Inc.
    c. Conn-Fab Sales, Inc.
    d. Curbs Plus Inc.

e. Custom Curb, Inc.
f. LM Curbs.
g. Loren Cook Company.
h. Metallic Products Corporation.
i. Pate Company (The).
j. Roof Products & Systems Corporation.
k. Roof Products, Inc.
l. ThyCurb; Div. of Thybar Corporation.
m. Uni-Curb, Inc.
n. Vent Products Company, Inc.

2. Material: Galvanized steel sheet, 0.079 inch (2.0 mm) thick.

3. Liner: Same material as curb, of manufacturer's standard thickness and finish.

4. Factory install wood nailers at tops of curbs.
5. Factory insulate curbs with 1-1/2-inch- (38-mm-) thick, glass-fiber board insulation.
6. Curb height may be determined by adding thickness of roof insulation and minimum base flashing height recommended by roofing membrane manufacturer. Fabricate units to minimum height of 12 inches (300 mm), unless otherwise indicated.
7. Sloping Roofs: Where slope of roof deck exceeds 1:48, fabricate curb units with water diverter or cricket and with height tapered to match slope to level tops of units.

2.5 Utility Distribution Box (UDB) Small Pipe Chase Housing Model AL 701.

A. Provide products as manufactured Pipe Chase Housing, PO box 507, Barco Manufacturing, LLC, P.O.Box 18, Wyncote, PA 19095, Phone: 267-628-1001 or provide equal products by another manufacturer approved in advance by the Architect, based upon

B. Housing size: 16 ½ inches long by 9 ¾ inches wide.

C. Housing height (without curb): 9 ½ inches.

D. Curb size: 15 ¼ inches by 8 ½ iches.

E. Curb height (without housing): 8 inches.

F. Material: Welded powder coated aluminum.

G. Seals: Provide seals for power, controls and refrigerant lines as required at each location. Coordinate with mechanical and electrical requirements

H. Location: As shown on the Contract Drawings.

2.6 ROOF HATCH

A. Roof Hatches: Fabricate roof hatches with insulated double-wall lids and insulated-wall curb frame with integral deck mounting flange and lid frame counterflashing. Fabricate with welded and sealed corner joints. Provide continuous weathertight perimeter gasketing and equip with corrosion-resistant or hot-dip galvanized hardware.

1. Manufacturers:

    a. Babcock-Davis; a Cierra Products Inc. Company.
    b. Bilco Company (The).
    a. J. L. Industries, Inc.
    b. Milcor Inc.; a Gibraltar Company.

2. Loads: Fabricate roof hatches to withstand 40-lbf/sq. ft. (1.9-kPa) external and 20-lbf/sq. ft. (0.95-kPa) internal loads.
3. Type and Size: Single-leaf lid, 30 by 36 inches (750 by 900 mm).
4. Curb and Lid Material: Galvanized steel sheet, 0.079 inch (2.0 mm) thick.
    a. Finish: Prime painted.
5. Insulation: Polyisocyanurate board.
6. Interior Lid Liner: Manufacturer's standard metal liner of same material and finish as outer metal lid.
7. Fabricate units to minimum height of 18 inches unless otherwise indicated.

2.7 GRAVITY VENTILATORS

A. General Description:
1. Ventilator is low silhouette for relief applications with natural gravity or negative pressure system
2. Relief units with throat widths through 48 inches are ship assembled when throat lengths do not exceed 96 inches
3. Each fan shall bear a permanently affixed manufacture's nameplate containing the model number and individual serial number

B. Hood and Base:

1. Material Type: Aluminum
2. Hood Constructed of precision formed, arched panels with interlocking seams
3. Vertical end panels are fully locked into hood end panels
4. Base height is standard of 5 inches
5. Curb cap is six inches larger then throat size
6. Curb cap has pre-punched mounting holes for installation
7. Dimensions: As indicated on Drawings.

C. Birdscreen:

1. Constructed of ½ inch[Galvanized] [Aluminum] mesh
2. Mounted horizontally across the intake area of the hood

D. Hood Support:

1. Constructed of galvanized steel and fastened so the hood can either be removed completely from the base or hinged open

E. Options/Accessories:

1. Roof Curbs:

a. Type: GPI
b. Material: Aluminum
c. Insulation thickness: 1.5 inches
d. Coating Type: None]

2. Extended Base:

a. Seven inch extension to base height making overall base twelve inches tall.
b. Raises the hood further above the roof deck to prevent snow or moisture intake

3. Curb Seal:

a. Rubber seal between hood and the roof curb

4. Dampers:

a. Type: Gravity
b. Prevents outside air from entering back into the building when fan is off
c. Balanced for minimal resistance to flow
d. Galvanized frames with prepunched mounting holes

2.8 DIRECT DRIVE ROOF DOWNBLAST CENTRIFUGAL EXHAUST FANS

A. General Description:
1. Downblast fan shall be for roof mounted applications
2. Performance capabilities up to 4,300 cubic feet per minute (cfm) and static pressure to 1 inches of water gauge
3. Fans are available in sixteen sizes with nominal wheel diameters ranging from 8 inches through 18 inches (071 - 180 unit sizes)
4. Maximum continuous operating temperature is 180 Fahrenheit (82.2 Celsius)
5. Each fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number.

B. Wheel:
1. Constructed of aluminum
2. Non-overloading, backward inclined centrifugal
3. Statically and dynamically balanced in accordance to AMCA Standard 204-05
4. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency.

C. Motors:
1. AC Induction Motor
2. Motor enclosures: Open driproof
3. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and furnished at the specific voltage and phase
4. Mounted on vibration isolators, out of the airstream
5. For motor cooling there shall be fresh air drawn into the motor compartment throughan area free of discharge contaminants
6. Accessible for maintenance

D. Housing:

1. Motor cover, shroud, curb cap, and lower windband shall be constructed of heavy gauge aluminum
2. Shroud shall have an integral rolled bead for extra strength
3. Shroud shall be drawn from a disc and direct air downward
4. Lower windband shall have a formed edge for added strength
5. Motor cover shall be drawn from a disc
6. All housing components shall have final thicknesses equal to or greater then preformed thickness.
7. Curb cap shall have pre-punched mounting holes to ensure correct attachment
8. Rigid internal support structure
9. Leak proof

E. Housing Supports and Drive Frame:

1. Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators

F. Vibration Isolation:

1. Rubber isolators
2. Sized to match the weight of each fan

G. Disconnect Switches:

1. NEMA rated: 3R
2. Positive electrical shut-off
3. Wired from fan motor to junction box installed within motor compartment

H. Options/Accessories:

1. Birdscreen:

   a. Material Type: Aluminum

   b. Protects fan discharge

2. Roof Curbs:

   a. Types: GPI

   b. Mounted onto roof with fan
   c. Material: Aluminum
   d. Insulation thickness: 1.5 inches
   e. Coating Type: None

3. Curb Seal:

   a. Rubber seal between the fan and the roof curb

4. Dampers:

    a. Type: Gravity
    b. Prevents outside air from entering back into the building when fan is off
    c. Balanced for minimal resistance to flow
    d. Galvanized frames with prepunched mounting holes

2.9 Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Custom Solution Roof and Metal Products.
2. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.

B. Metal: Stainless steel

C. Height: 13 inches (330 mm).

D. Diameter: As indicated and required.

E. Finish: Manufacturer's standard.

2.10 SIPHONIC ROOF DRAINS

A. 14-9/32 inch Diameter Siphonic Roof Drain with Dura-coated ductile iron drain body, membrane flashing clamp, and low silhouette cast iron dome. Complete with vandal-proof secured, Dura-coated cast iron air-restricting baffle and grate.

2.11 ROOF DRAINS

A. ANSI A112.21.2M; provide hot-dip galvanized cast-iron or ductile-iron drains, with minimum of 12-inch diameter body, non puncturing flashing clamp device with integral gravel stop and deck clamp, and removable cast-iron or ductile-iron locking dome. Free area of dome shall be not less than two times the free area of drain outlet. Provide drain flashing ring seat flush with adjacent roof deck, and secure rigidly in place with deck clamp.

2.12 RAIN LEADER PIPING, FITTINGS AND PLASTIC SOLVENT FOR ROOF DRAINAGE SYSTEMS

A. Polyvinyl chloride system, ASTM D 2665. Minimum size to be four inch diameter.

B. Hangers, Supports and Anchors for Rain Leader Piping: Provide pipe suspension systems in accordance with good recognized practice to secure pipes, prevent pipe vibrations, maintain required elevations, provide for expansion and contraction, and to make a neat appearance.

C. All piping systems shall have adequate hangers, supports, guides and anchors designed in accordance with the latest requirements of Manufacturers Standardization Society Documents SP-58 and SP-69. Perform accurate weight balance calculations to determine the required supporting force at each hanger and support location and the pipe weight load at each equipment connection. Hangers and supports shall be designed to support the weight of pipe, valves, fittings, insulation and the weight of the medium transported or used for testing, whichever is heavier. Ensure that the support assembly is capable of supporting the line under all operating conditions.

D. All insulated and non-insulated suspended piping shall be supported in hangers approved equivalent to Grinnell Figure 260. Hanger shall be large enough to accommodate pipe with insulation where applicable. Insulation shall rest on sheet metal sleeve of sufficient length to prevent crushing insulation.

E. Provide galvanized brackets and racks to support piping run adjacent to walls or steel columns.

F. Provide auxiliary steel as required for the installation of all hangers, supports and anchors.

G. Wire or strap hangers shall not be used.

H. Where conditions are such that the above specified hangers are not suitable, submit for review by the Architect the types of hangers proposed.

I. Hangers that come in contact with the pipe shall have construction to match pipe.

J. Hanger rods shall be steel construction. Maximum loads for threaded steel hanger rods shall be in accordance with the following:

1. | Rod Diameter (Inches) | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1-1/8 | 1-1/4 |
|---|---|---|---|---|---|---|---|
| Maximum Loads (Lbs) | 610 | 1130 | 1810 | 2710 | 4960 | 6230 | 8000 |

K. Insulate all rain leaders and/or roof drain piping and drain bowls installed as a part of this project.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.

1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored and is ready to receive roof accessories.
2. Verify dimensions of roof openings for roof accessories.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install roof accessories according to manufacturer's written instructions. Anchor roof accessories securely in place and capable of resisting forces specified. Use fasteners, separators, sealants, and other miscellaneous items as required for completing roof accessory installation. Install roof accessories to resist exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Install roof accessories to fit substrates and to result in watertight performance.

C. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.

D. Roof Curb Installation:

1. Set roof curb so top surface of roof curb is level.

E. Equipment Support Installation:

1. Set equipment support so top surface of equipment support is level.

F. Roof Hatch Installation:

1. Check roof hatch for proper operation. Adjust operating mechanism as required. Clean and lubricate joints and hardware.
2. Attach safety railing system to roof hatch curb.
3. Attach ladder safety post according to manufacturer's written instructions.

G. Pipe Support Installation:

1. Roof Supports

   a. Install anchors or equipment in accordance with manufacturer’s printed instructions, shop drawings and as specified.

   b. Where necessary, provide protection against deterioration due to contact of dissimilar materials.

   c. Ensure work is inspected prior to application of roofing.

2. Flashing

   a. Install roof support flashing in accordance with manufacturer’s printed instructions.

   b. Set deck flange in layer of membrane adhesive and extend single ply up sleeve to highest elevation possible and clamp membrane to flashing. Weld roofing to deck flange using PVC torch.

H. B Vent Installation:

1. Set deck flange in layer of membrane adhesive and extend single ply up sleeve to highest elevation possible and clamp membrane to flashing. Weld roofing to deck flange using PVC torch

I. Seal joints with elastomeric sealant as required by manufacturer of roof accessories.

3.3 TOUCH UP

A. Touch up factory-primed surfaces with compatible primer ready for field painting in accordance with Division 09 painting Sections.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.4 CLEANING

A. Clean exposed surfaces according to manufacturer's written instructions.

END OF SECTION 077200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Urethane joint sealants.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Qualification Data: For qualified Installer and testing agency.

E. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

F. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

H. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

1.5 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

D. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 URETHANE JOINT SEALANTS

A. Single-Component, Nonsag, Urethane Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. BASF Building Systems; Sonolastic NP1.
    b. Bostik, Inc.; Chem-Calk 900.
    c. May National Associates, Inc.; Bondaflex PUR 25.
    d. Pacific Polymers International, Inc.; Elasto-Thane 230 Type II.
    e. Pecora Corporation; Dynatrol I-XL.
    f. Sika Corporation, Construction Products Division; Sikaflex - 1a.

B. Multicomponent Pourable Urethane Sealant:

1. Products:

    a. Bostik Findley; Chem-Calk 550.
    b. Meadows, W. R., Inc.; POURTHANE.
    c. Pacific Polymers, Inc.; Elasto-Thane 227 Type I (Self Leveling).
    d. Polymeric Systems Inc.; PSI-270SL.
    e. Schnee-Morehead, Inc.; Permathane SM 7201.
    f. Tremco; THC-901 or THC-900. (to suit slope)
    g. Tremco; Vulkem 245.

2. Type and Grade: M (multicomponent) and P (pourable).
3. Class: 25.
4. Use Related to Exposure: T (traffic).
5. Uses Related to Joint Substrates: M, A, and, as applicable to joint substrate, O.

2.3 JOINT SEALANT BACKING

A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of ceramic tile.
    d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

3.4 FIELD QUALITY CONTROL

A. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 099133 - RUST CONVERTER AND METAL PRIMER

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Rust converter and metal primer.

1.2 REFERENCES

A. ASTM D 66 - Flash Point by Tag Closed Tester.
B. ASTM D 1475 - Density of Paint, Varnish, Lacquer, and Related Products.
C. ASTM D 3960 - Volatile Organic Compound (VOC) Content of Paints and Related Coatings.

1.3 SUBMITTALS

A. Comply with requirements of Section 01300 - Submittals.
B. Product Data: Submit manufacturer's product data, including specifications and application instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
B. Storage: Store materials indoors in an area protected from direct sunlight and damage and in accordance with manufacturer's instructions.
C. Storage Temperature: 38 degrees F to 105 degrees F.
D. Do not allow material to freeze.
E. Handling: Protect materials during handling and application to prevent damage.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Apply when steel and air temperatures are between 45 degrees F and 100 degrees F.
B. Do not apply within 2 hours of expected rain.
C. Do not apply until morning dew is gone.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include:
   1. *Corroseal*; as manufactured by J. T. Geiger enterprises, Inc. (d.b.a. Corroseal), P.O. Box 788, Coupeville , Washington 98239, phone (800) 237-1573, fax (360) 678-1943 **Basis of Design**
   2. *Rust Converter*; as manufactured by Total solutions, Milwaukee, WI available thru www.theruststore.com

3. *1 Step - The Rust Killer*; as manufactured by Interstate products Inc. 1-800 474-7294.
4. *M82 Rust Converter*; as manufactured by Benjamin Moore & Co.

2.2 MATERIALS

A. Rust Converter and Metal Primer: Rust Converter and Copolymer Metal Primer. Water based rust converter (tannic acid) combined with an unpigmented, latex copolymer metal primer. Converter turns rust into a metallic barrier layer of black, nonrusting magnetite. Primer acts as a bonding agent for epoxy, enamel, acrylic, moisture cured polyurethane, and oil-based finishes.
   1. Volatile Organic Compounds (VOC), ASTM D 3960: 67 grams per liter max.
   2. Total Dry Film Thickness: 2.5 mils minimum.
   3. Number of Coats: 1.
   4. Coverage: Approximately 300 square feet per gallon (10 mil wet coat).
   5. Number of Components: One.
   6. Weight per Gallon, ASTM D 1475: 8.6 pounds.
   7. Flash Point, ASTM D 56: Over 200 degrees F.
   8. Non-flammable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspect surfaces and adjacent areas where rust converter and metal primer will be applied.

B. Notify the Architect of conditions that would adversely affect the application of the rust converter and metal primer. Do not proceed with application until unsatisfactory conditions are corrected.

3.2 PROTECTION

A. Protect adjacent work and surrounding areas from contact with rust converter and metal primer.

3.3 SURFACE PREPARATION

A. Prepare surfaces in accordance with manufacturer's instructions.
B. Remove all loose rust, loose mill scale, oil, grease, dirt, soil, salt, paint, acids, alkalines, and other deposits.
C. Removal of intact rust is not required. Anchor profile is required as original surface preparation, now rusted.
D. Remove standing water and sources of running water.

3.4 APPLICATION

A. Apply rust converter and metal primer for conversion of rust and priming of metal in accordance with manufacturer's instructions.

B. Do not thin.
C. Do not use with zinc, zinc chromate, zinc phosphates, chromates, copper powder, magnesium borate, graphite, or lead pigments, pickled cold-rolled steel.
D. Do not use in direct contact with food.
E. Roof insulation installation can occur immediately after application.

3.5 CLEANING

A. Remove and dispose of all temporary materials used to protect adjacent work and surrounding areas.
B. Immediately remove and clean rust converter and metal primer from surfaces not intended to receive the material. For equipment and personnel, use soap and water. For dried spatter, use lacquer thinner.

END OF SECTION 099133